A realistic account of evidence-informed tobacco control practice in Ontario public health agencies

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Policy-makers, research funders, and practitioners acknowledge the need for theories about the uptake of scientific evidence into policy and programs to reduce population-wide risk factors for the major avoidable chronic non-communicable diseases. Models of evidence-informed practice in public health settings have not been developed through systematic scientific inquiry. This study explores and develops a realistic account of evidence-informed tobacco control practice in Ontario public health agencies.

In-depth, intensive, semi-structured qualitative interviews were conducted with twelve local public health agency senior executives and other key tobacco control staff in three diverse public health agencies in Ontario, Canada. Interviews explored aspects of tobacco control related decision-making and practice, as well as supports from regional, provincial, and national levels that might enhance tobacco control practice. Interview data were supplemented by field notes and other documentation provided by interviewees, as well as unobtrusive sources.

A grounded theory approach to the analysis of textual data identified six major and many subcategories and dimensions implicated in evidence-informed tobacco control practice in local public health agencies. The major category structure includes: information and evidence, interpretation and decision-making, organizational aspects, organizational environment, practice integration, and time. An overall model and five sub-models were developed describing the relations among core category and sub-category factors. Propositions were developed *a priori* based on an extensive review of the literature. Potentially relevant social theories and concepts were also identified based on a selective review of the literature, including critical realist and other perspectives pertaining to agency-structure issues. Theories and propositions were reviewed, which resulted in a minor modification to the subcategory structure of one branch. Public health agency tobacco control case descriptions were developed based on a final category structure, including six branches, 27 sub-branches, and 98 twigs, and verified (subject to some adjustments) through a member check.

Working knowledge is seen to be complex and socially constructed, incorporating aspects of social cognitive and planned behavior theories and Aristotelian intellectual virtues. Realist social theory offers insights into potential change processes. Contributions of the study of theory, practice and methods are discussed, as are strengths and limitations, and areas of needed future research.

Key words: evidence-informed, tobacco control, public health, practice, grounded theory, realism

Acknowledgements

Having clear aims, reasons for action, and a plan; valuing hard work and perseverance; and, approaching tasks with optimism, self confidence and humility are all lessons that I learned from my parents. My mother and late father expressed to me many times their knowledge that this work would be completed, as they believed in me, my commitment to complete the Ph.D. and felt that I could make contributions to my chosen field. If this thesis is an accomplishment at all, they surely have a share in it.

This work is dedicated to public health professionals in Ontario, particularly the twelve anonymous individuals that contributed their insights and time to this study. Without their participation, this study would not have been possible. They demonstrated deep understanding of tobacco control science. They were insightful about their organizations and community contexts. They were very thoughtful about how to interpret information including scientific evidence, and about how to direct or take action to reduce Ontario's leading cause of avoidable premature death. We are well served by them. I hope that this document serves to make a contribution to their tobacco control practice. Hopefully, these professionals will judge that I have documented the complexity of their work worlds, the professionalism with which they approach their work, and attempted to contribute some clarity about the myriad factors that affect evidence-informed practice in their public health agencies. It is also hoped that this study may provide impetus for systems interventions, including future studies that will support them in their important roles.

Roy Cameron, my supervisor throughout my Ph.D. studies and chair of the dissertation committee, has been a colleague and a great friend. He is a master teacher capable of guiding his students with provocative questions, encouragement, and constructive criticism. He is a busy man, yet somehow always finds the time to be available to guide his students. Clearly, he cares about his many roles and has great impact as a result. I have learned from and hope that I am able to model my future roles after his examples – to care about a mission, to pursue rigor in thinking and action in science, policy and practice, and to inspire others to make a contribution to their optimal potential.

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know it will affect me for the rest of my life. Each of these teachers made me realize that choosing the University of Waterloo for the third degree was a wise choice. Irving Rootman, external examiner for this thesis, is a well recognized and accomplished international leader in health promotion research. It was indeed my honor to have been examined by such an expert and intellectual.

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Roberta Garcia, my wife, knows more than anyone the time that this thesis and prior studies stole from our finite time together – mornings, evenings, weekends, and vacations. My children, Jason and Sarah, demonstrated to me through their own studies and encouraging mine that education remains important in our family. Roberta understood the importance of it to me, and she was supportive and always near by. I am glad to have her as my life long companion, for without her, I would not be able to provide a realistic and meaningful account of anything.

Thanks to each of you. Of course, this thesis is my own and I accept all responsibility for any shortcomings or errors which may be found in this study.

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Preface

At the outset, this study sought to make contributions in three areas: (1) the development of a grounded theory of evidence-informed tobacco control practice in Ontario public health agencies – focusing on the social construction of knowledge and program/policy realities of tobacco control at the local level; (2) a practical contribution to improve the performance of the public health system through a better understanding of the role of knowledge workers and how they might be better supported to do their jobs; and, (3) methods development for social inquiry and evaluative research in other areas of knowledge-exchange related research and practice.

This manuscript was prepared for the purposes of the dissertation committee examination at the University of Waterloo. However, beyond this purpose, it is anticipated that there will professional and scientific interest in this study.

Some readers may be interested to read the entire document, but this will certainly not be the case for everyone. The following therefore are a few suggestions for how this document might be read by various audiences. It is hoped that this contributes to efficient access to material of interest to readers.

The study is based in local public health agencies in Ontario. The reader who is not familiar with this context may find the list of acronyms provided in Appendix A – List of Acronyms (page 223) to be helpful.

Those interested primarily in the substantive aspects of the grounded realistic theory will find Table 7: Final Category Structure (page 130) of interest and use. Figure 2 (page 112) presents the model of evidence-informed practice in tobacco control. Figures 3 through 7 (pages 114 to 119) describe sub-models explicating the core categories and their relations. These may be found in the section pertaining to the phase 3 analysis – preliminary theory (which did not change substantially as a result of subsequent analyses). Detailed descriptions of the myriad factors and their relations are found in the sections pertaining to phase 2 and 3 analyses which are the integration and elaboration of the categories (pages 56-110) and description of the models (page 110-120). Answers to the research questions (pages 147-169) will also be of interest.

Those interested in the practical contribution should be interested in the theory as it specifies the complex of factors contributing to evidence-informed practice in public health. There should also be interest in Table 9 – Additional Supports From Regional, Provincial and National Levels (page 144). The section dealing with implications for practice (starting at page 192) should also be read by those working in the tobacco control resource system or Ontario Ministry of Health Promotion. The extensive literature review of factors contributing to knowledge use (Appendix C, starting at page 227) and definitions of knowledge and related concepts (Appendix D, starting at page 272) provide useful references to key literatures.

Those interested in methods may find the approach to analysis and interpretation, based on induction, deduction and retroduction of interest. The approach to the gathering of data and the five phased method of analysis and interpretation is explained in detail in the methods section (pages 21-32) and discussed vis-à-vis strengths and limitations (pages 169-185). The critical realist perspective used in this study is described and discussed (starting at 186). The overall method including the decision trail is summarized as Table 10: Methods and Decision Trail (page 183). Implications for methodology are outlined (starting at page 198).

The author is interested in feedback from readers (please send comments to johnmgarcia@sympatico.ca). Taking Barney Glaser's dictum seriously that "all is data", feedback will be seriously considered for either incorporation into or modification of the grounded realistic theory. It is sincerely hoped that this study will provoke thought, discussion, and lead to insightful approaches to advance evidence-informed public health practice and action-oriented research contributing to practice-based evidence.

I. Introduction

How to ensure that the best available scientific evidence and professional knowledge is integrated into public health system policy and practice to effectively reduce the chronic non-communicable disease remains a conundrum, as it was more than 30 years ago when then Federal Health Minister Marc Lalonde exhorted Canadians to adopt a *New Perspective on the Health of Canadians* (Lalonde, 1974). While much has changed, public health leaders in Canada recognize that we have a long way to go in order to understand the processes that translate existing knowledge into effective public health action (Kiefer et al., 2005).

Substantial resources have and are being invested in research and development, as well in the delivery of public health services in Canada and around the world. Yet very little is known about the processes to bridge the scientific discovery-application (research-practice) gap. As a result, research funders are starting to call for a multifaceted partnership approach involving researchers and practitioners to review existing models and develop new conceptual frameworks to effectively translate research into practice and practice to research (Kerner et al., 2005; Kerner, Rimer, & Emmons, 2005; Kerner, 2006). There has also been recognition of the need for theory development and empirically tested models of knowledge translation at individual, organizational, and system levels (Grimshaw & Eccles, 2004; Shojania & Grimshaw, 2005).

Knowledge itself is a complex phenomenon: involving knowing what to do and how to do it, with many contextual, political and moral dimensions (Flyvbjerg, 2001). It may be tacit and/or explicit (Bateson, 1972; Polyani, 1983); and, it may be personal or social.[1]

Cameron and Riley (2006 & 2007)[2] have been persuasive Canadian advocates for a "blueprint" for knowledge development and use to support population interventions for chronic disease prevention and healthy living. Their model includes roles for many

[1] There is also a proliferation of terminology related to research and knowledge transfer/translation/exchange; although there is also a growing clarity about what various terms may mean and their relations (Graham et al., 2006). A comprehensive review of factors associated with the spread of practices related concepts was completed for the United Kingdom's National Health Service (Greenhalgh, Robert, MacFarlane, Bate, & Kyriakidou, 2004; Greenhalgh et al., 2005).

[2] Many personal communications, as well as presentations and discussions related to the development of a Canadian Best Practice System for Chronic Disease Prevention, in the context of Public Health Agency of Canada strategic and working committees.

players and may be seen as a framework for research, theory/framework construction, and practice. This particular research project contributes to understanding of the local program aspect of their model, by contributing a realistic account of factors associated with knowledge use by local public health professionals, specifically tobacco control coordinators (TCCs)[3] and other professionals working in Ontario public health agencies (PHAs)[4] whose practice decisions are informed by a variety of forms of evidence and other important considerations. A theory of knowledge use by knowledge workers was developed through an analysis of interview data and supplementary field notes and documents (inductive/deductive method), a review of the literature on knowledge exchange in a variety of settings (deductive method), extant social theory and reflection (retroductive/abductive method). This study contributes to understanding the complex of contextual, structural, and socio-cultural factors that affect how knowledge workers acquire, develop and apply working knowledge in an important public health setting (i.e. as a important case in point). From the outset, it was anticipated that this study would also help tobacco control coordinators and other public health tobacco control professionals by informing the development of the technical assistance and training system that the Ontario Government is developing to better support tobacco control partners as they carryout their roles within the Smoke-Free Ontario strategy and broader tobacco control initiatives. The methods of inquiry developed and applied here – specifically a critical realist approach that is ontologically realist, epistemologically fallible, yet judgmentally rational (Bhaskar, 1998) and informed by a grounded method of qualitative inquiry augmented by relevant literature and social theory – were also anticipated to demonstrate promise for application in other social research and evaluation contexts. A discussion of the context and background, rationale for the study, and methods follows.

[3] A list of acronyms is included in Appendix A.

[4] Public health agencies (PHAs) are defined as the organizations responsible to the local medical officers of health, which in turn is accountable to the boards of health, communities and Ministry of Health and Long Term Care for the management of all aspects of PHA operations (cf. Association of Local Public Health Agencies, 2004). Public health units (PHUs) are the geographic units including the resident population and physical geographic area within which the boards of health and respective medical officers of health and PHAs are responsible for the delivery of public health programs under various provincial and local mandates, including but not limited to the Mandatory Health Programs and Services Guidelines Pursuant to the *Health Protection and Promotion Act, 1984* (HPPA) and subsequent revisions.

II. Context and background for the proposed study

A. Chronic disease, risk factors and efforts to control them. Chronic non-communicable diseases are major contributors to avoidable premature death internationally (Strong, Mather, Leeder, & Beaglehole, 2005) and the major cause of public health burden in Canada (Harvey et al., 2002). These diseases include cardiovascular diseases, cancer, chronic lung diseases, and diabetes, among others.

The vast majority of non-communicable chronic disease cases could be delayed or avoided by the control of physiological, physical and behavioral risk factors and social conditions. Moreover, high blood pressure and hypertension, high blood cholesterol and hypercholesterolemia, glucose intolerance and diabetes, overweight and obesity, poor nutrition, physical inactivity, alcohol overuse, and tobacco consumption and exposure to second hand smoke are leading, avoidable risk factors to premature disease, disability and death in Canada (Harvey et al., 2002). Major risk factors are more prevalent among lower socio-economic groups in Canada (Choinière, Lafontaine, & Edwards, 2000). While there have been some apparent gains in the reduction of tobacco use in Canada, smoking attributable mortality and premature mortality from tobacco caused disease remains at unacceptably high levels (Baliunas et al., 2007). Reducing the population-wide prevalence of a small finite set of risk factors and doing so in a manner that will reduce inequalities in disease risk and burden remains a key challenge for the public health promotion system[5].

Canada has long been recognized as a leader in health promotion internationally (Lalonde, 1974; Law et al., November 2004). Organizations responsible for leading the Canadian Strategy for Cancer Control – specifically the National Cancer Institute of Canada/Canadian Cancer Society, Canadian Association of Provincial Cancer Agencies, and Health Canada (now Public Health Agency of Canada) – see the benefits of

[5] In this study, public health system is defined broadly to include partnerships involving governments with voluntary and private sectors. Public health agencies, Ontario Government Ministries, and the Public Health Agency of Canada are differentiated throughout this document and these refer to official governmental public health structures.

collaborating with other disease and risk factor specific organizations and networks. They have joined other organizations, under the auspices of the Chronic Disease Prevention Alliance of Canada (cf. cdpac.ca) in common cause to reduce Canadian risk factor prevalence.

The Canadian Heart Health Initiative, Canadian Diabetes Strategy, Canadian Strategy for Cancer Control, National Strategy for Tobacco Control in Canada, and many other international, provincial and local public health initiatives have recognized the importance of taking an evidence-based approach to public health practice that includes research, surveillance and knowledge exchange activities. Cameron et al. have recently documented hopeful developments in Canada pertaining to innovations in population health intervention research that link leaders in chronic disease prevention research, policy, and practice (Cameron, Bauman, & Rose, 2006).

B. A vision of research, policy and practice integration. Prominent public health scientists in Canada (Best et al., 2003; Best, Hiatt, Cameron, Rimer, & Abrams, 2003; Cameron, Brown, & Best, 1996; Cameron, Jolin, Walker, McDermott, & Gough, 2001; Kiefer et al., 2005) and the United States (Biglan, Mrazek, Carnine, & Flay, 2003; Biglan, 2004; Cullen, 1986; Greenwald & Cullen, 1985; Greenwald & Cullen, 1988; Green & Kreuter, 2005; Green & Glasgow, 2006; Green, 2006; Hiatt & Rimer, 1999; Hiatt & Rimer, 1999; Oldenburg, Hardcastle, & Kok, 1997; Green, 2006; National Cancer Institute, 2007; M. Orlandi, 1996; M. A. Orlandi, 1986; Parcel et al., 1995) have concerned themselves with dissemination of research findings, diffusion of innovation, knowledge transfer, knowledge exchange and knowledge transfer in health and health promotion.

Recently, Cameron et al. (2007) have stated that "We envision a future in which a comprehensive, coherent *macrolevel system* (integrated across national, provincial or state, and local levels) will enable communities to take evidence-informed action to improve the health of citizens at the population level. This system will enable communities to pinpoint intervention opportunities with the highest potential impact,

identify the most optimal intervention approaches, access intervention resources, and use local data collection and feedback resources to continuously guide, evaluate, refine, and learn from their work" (Cameron et al., 2007; p. 648).

For more than 30 years, cancer control has been advanced in North America as a process that involves collaboration amongst researchers, practitioners and decision-makers (Best et al., 2003). Yet scientifically validated strategies for advancing evidence-informed practice have been slow to develop. Nevertheless, there is reason to be optimistic that we can implement comprehensive, evidence-based, population-wide strategies with impact on risk factors (Puska, 2002).

Fortunately, the scientific leadership in Canada has recognized the need to transfer research knowledge into practice (Canadian Institutes for Health Research, Institute of Population and Public Health, May 2003). A network and system for knowledge generation and dissemination does not yet exist in Canada (Canadian Institutes for Health Research, 2006; Kiefer et al., 2005). However, leadership being exercised by organizations in Canada gives reason for optimism that this will be forthcoming in the future (e.g. Canadian Tobacco Control Research Initiative, Canadian Institutes for Health Research, 2006). The Chronic Disease Prevention Alliance of Canada wishes to lead the coordinated development of an overall system of chronic disease prevention in Canada through integrated strategies targeted to common risk factors (i.e. tobacco industry products, poor nutrition, and physical inactivity).

C. Availability of scientific syntheses. There has been a recent resurgence in interest in public health in Canada, including the need to foster evidence-based public health practice through the creation of networks and an evidence centre (Kiefer et al., 2005). Additionally, there is a plethora of sites on the world wide web that provide information to public health professionals to inform and guide policy and practice decisions (cf. www.cancercontrolplanet.cancer.gov ; www.thecommunityguide.org ; www.health-evidence.ca ; and www.vichealth.vic.gov.au/cochrane/ as examples). The Centre for Chronic Disease Prevention and Control of the Public Health Agency of Canada recently

launched a web-based initiative to provide efficient access to the reviews on theses sites, among others, as part of an evolving "best practices" system for chronic disease prevention in Canada (cf. http://cbpp-pcpe.phac-aspc.gc.ca/index_e.cfm for the portal). Yet as discussed above, how to optimally affect use of evidence in public health and how to better foster knowledge exchange in support evidence-informed decision-making is not well understood. Information alone is generally seen as insufficient to change behavior among individuals, and complex systems are more difficult to influence.

D. Best practices for comprehensive tobacco control and developments in the province of Ontario. The US Centers for Disease Prevention and Control have developed guidelines for comprehensive tobacco control (Centers for Disease Control and Prevention, October 2007). Previous versions were developed for use by state tobacco control planners and advocates at a time when American states were deciding if and how to invest dollars that were provided to them following a legal settlement (involving state attorneys general and tobacco companies in lieu of court proceedings for medical care cost reimbursement). This document, among many others, provides evidence that given resources, state health departments are able to implement comprehensive integrated strategies for tobacco control. There is also a dose-response relationship between investments in tobacco control and tobacco use reduction: states applying greater resources to tobacco control are able to mount more intensive interventions which in turn yield greater reductions in tobacco use. The experience from the states of Massachusetts and California are particularly impressive. Both state programs were built using a framework for intervention developed by the US National Cancer Institute (i.e. ASSIST – American Stop Smoking Intervention Study for Cancer Control; (U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, 1991; U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, 2005; U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, 2006).

The Ontario Tobacco Strategy was designed in the early 1990s on the same model. While other organizations such as the Canadian Cancer Society – Ontario Division, Heart and Stroke Foundation of Ontario, and Ontario Lung Association are involved, only local boards of health (LBH) are mandated to have their staff execute tobacco control activities under the *Health Protection and Promotion Act* (i.e. the principal legislative framework for public health in Ontario.)

Recent policy changes in Ontario by the McGuinty Government have seen investments by the provincial government in tobacco control increase to $60 million per year. In addition, provincial policies raised the price of tobacco products and eliminated legal workplace and public place smoking. The principal investigator for this proposed study played a role in policy development and initial execution of the renewed Ontario Tobacco Strategy, now referred to as the Smoke-Free Ontario (SFO) strategy[6].

To support the implementation of the strategy, the Province funded provincial and local programs delivered by government and non-governmental health organizations. There is also a provincial coordinating committee – known as the Community Action Working Group (CAWG) – and regional coordinating mechanisms – known as Tobacco Control Area Networks (TCANs).

Each local public health agency hired a Tobacco Control Coordinator (TCC) to lead and coordinate efforts in each of Ontario's 36 public health units (PHU). As such the TCC is a key person in a pivotal position; serving as a conduit for knowledge exchange and with a mandate affecting program and policy changes with and through actions with her/his own health agency and community partners and coalitions. These individuals putatively serve as agents of change within the contexts and structure of their roles. Moreover, TCCs are critical to the success of the strategy. It is therefore important to understand clearly their roles in knowledge acquisition, development, and use and support them in effectively carrying this out this role. Factors in public health system environments –

[6] Please note also that brief biographic statement – as related to this specific research project – is included as Appendix B. This discloses the author's background and personal history (for those who are not familiar with it) which could affect his theoretical sensitivities and how this study was approached.

including local circumstances (e.g. tobacco growing, economic base) and provincial policy (e.g. decision to fund particular interventions) may greatly affect the personal or collective efficacy of public health professionals to implement evidence-informed practice and to coordinate the efforts of others in their public health units. Other public health professionals also play important roles to advance practice of tobacco control at the local level.

E. Current state of knowledge about knowledge exchange. Several literatures may inform knowledge generation and exchange strategies for the prevention of chronic disease (including cancer control and tobacco control strategies). These include literatures pertaining to cancer control research and development (a leader among disease-directed research, development, and dissemination strategies), health care knowledge transfer exchange, dissemination and transfer in other settings (e.g. workplace, schools, and systems), business and organizational learning, and evaluative research. See Appendix C for an extensive overview of various literatures relevant to knowledge exchange and utilization in public health settings.

F. Knowledge, working knowledge, and related concepts. Any study of knowledge use in general, and working knowledge development in particular, requires a definition of knowledge. There is a variety of literature on this topic and a great many perspectives to consider (See Appendix C). One critical point however to note is that knowledge, regardless of the breadth or specificity of definition used, is seen to be a phenomenon developed and shaped through social experiences including practice.

Given that this is a study leading toward a theory of evidence-informed practice in Ontario public health units, it was important to ensure that the ultimate definitions emerging from this study were grounded in the experience of public health professionals working in local tobacco control, particularly TCCs. Appendix D contains some definitions of knowledge and related concepts.

Table 1 (page 17) provides some sensitizing concepts which were used as a starting point for this study. These concepts were developed considering social theories. These included Parsonian action theory (Casey, 2005; Parsons, 1937a; Parsons, 1937b), Ajzen's theory of planned behavior and reasoned action (Ajzen, 1991; Ajzen, 2002; Ajzen & Fishbein, 2005), social cognitive theory (Bandura, 1986; Bandura, 2000; Bandura, 2001; Bandura, 2004; Bandura, 2004), Flyvbjerg's analysis of factors relevant to planning decisions (Flyvbjerg, 2001), critical realism (Archer et al., 1998; Bhaskar, 1998), habitus (Bourdieu's theory of practice; Bourdieu, 1977) and cultural morphogenesis theory (Archer, 1996), among others. They were also informed by the investigator's *a priori* understanding of the factors likely to be involved in local public health practice and decision-making. This understanding was informed by his own experience (Appendix B) and his reading of the literature pertaining to knowledge exchange; including health and business literatures (see Appendix C).

As detailed in the methods and results section below, in addition to the review of literature pertaining to knowledge exchange in the health, health care, and business literature, a review of extant social theories was also conducted by the investigator as the study was being conducted in order to enhance his theoretical sensitivity as an analyst and to provide an additional check on his thoroughness in grounded analysis. These theories are listed later (in Table 6: Social Science Theories and Concepts Potentially Relevant to a Theory of Evidence-Informed Practice in Local Tobacco Control Action Systems; pages 122-126).

In taking guidance from Glaser and Strauss (1967), and particularly from Glaser (1998), there was a conscious attempt to limit the degree of influence from existing extant literature that may be relevant to the theory before the analysis of data. However, the literature reviews were conducted by the investigator during the course of his doctoral studies at the University of Waterloo. There were the practical realities of conducting post graduate studies on a part time basis and the need to present a Ph.D. thesis proposal that could be substantively justified, in part, on the basis of literature. It should be obvious that some conceptual orientation is necessary before any social science

investigation (cf. Schütz, 1954) and the use of sensitizing concepts provided a pragmatic compromise.

The investigator took Charmaz's suggestion (2006) to "let this material lie fallow until after you developed your categories and analytic relationships between them" (p. 166). These issues are also addressed in the analysis and discussion sections.

G. Sources of information factoring into tobacco control professionals' working knowledge. There is a broad range of information that could potentially be considered by public health professionals. They formulate expectations/knowledge about the likelihood of attaining outcomes, being able to execute actions, and consider what might be appropriate in their situations, including considerations of long term implications. Clearly, any analysis of working knowledge needs to consider many sources of information. Moreover, as discussed below, there was initially *prima facie* evidence that the working knowledge of public health professionals in general and TCCs in particular is comprised of much more than scientific articles or syntheses of evidence from them.

A list of eleven (11) possible sources of information, subdivided into three broad categories, is as follows:

- Empirical evidence
  - Scientific literature, including published studies and systematic reviews;
  - Community/population health assessments (burden and its distribution in populations);
  - Surveillance of population health indicators (e.g. smoking prevalence by age, sex, cultural group, geographic area/public health unit over time and space);
  - Service monitoring information (e.g. resources, activities, outputs of programs delivered);
  - Evaluative research – developmental evaluation (e.g. logic model construction), processes (engaging clients and stakeholders in determining questions, use of data gathering tools etc.) and products of evaluations (reports, presentations, and other communications)
- Technical assistance, training, and reflective practice
  - Practical guidance about public health practice aspects in the form of technical assistance and training (e.g. techniques of health education, community organization, social marketing, media advocacy etc.);

- Continuing professional development, including participation in practice and professional organizations and networks, conferences and trainings (i.e. internal or external to the organization);
- Reflective professional practice (i.e. reflection while taking action [thinking on your feet] and subsequently as post hoc interpretation);

➢ Background information
- Accountabilities, imperatives, and obligations – expectations of others for execution of certain actions/duties, including legally mandated responsibilities, performance contracts and role expectations;
- Availability of economic, human, and material resources; and,
- History and tradition.

Systematic reviews are available from several internet sites, as mentioned above. Community or population health assessments are essential public health functions (Frank, DiRuggiero, & Moloughney, 2003). Service monitoring is an aspect of the current Smoke-Free Ontario Strategy which is creating a performance indicators monitoring system. Evaluative research is an integral aspect of all comprehensive tobacco control strategies that apply a "best practices" approach (Centers for Disease Control and Prevention, August 1999; Centers for Disease Control and Prevention, October 2007), including Ontario's tobacco control strategy. Training and technical assistance are offered by the Ontario Health Promotion Resource System in Ontario (www.ohprs.ca), including the Program Training and Consultation Centre (www.ptcc-cfc.on.ca) which offers a "better practices tool kit for tobacco control". Furthermore, in Ontario there is a Public Health Research, Education and Development program (www.phred-redsp.on.ca). Reflection and reflective research may take many forms, including frame analysis, description and analysis of images/cases etc., methods of inquiry and overarching theories, and research on the process of reflection itself (Schön, 1983). Last but not least, public health has long performed a range of roles and responsibilities in communities with deep traditions, many of which may or may not be legally mandated by provincial legislation or regulations. Communities sometimes look to public health for leadership in addressing determinants of public health, including the causes of chronic disease, which of course includes smoking.

H. General basic model (stated *a priori*). Based on previous literature reviews, several propositions were identified and lessons and implications drawn from various literatures. Specifically, the literatures pertaining to knowledge exchange in cancer control, health care policy and practice, government (generally), various settings relevant to public health practice (e.g. schools, workplaces), business literature (including organizational learning) and evaluative research were used to develop propositions and "sensitizing concepts" for this study. These are discussed in Appendix E. Sensitizing concepts are identified in Table 1 (page 17) and additional propositions presented in Appendix E are used in part of the analysis.

The basic philosophical perspective adopted for this study was that of scientific realism, which follows from a realist tradition in the philosophy of science (cf. Archer et al., 1998). Scientific realism (critical realism when applied in social science) is a model of scientific understanding that is midway between positivist and relativist poles. It stresses generative mechanisms of causality embedded in stratified social reality. Pawson and Tilley (1997), Pawson, Greenhalgh, Harvey, & Walshe (2005), and Mark, Henry and Julnes (Henry & Rog, 1998; Henry & Mark, 2003; Julnes & Mark, 1998; Julnes, Mark, & Henry, 1998; Mark, Henry, & Julnes, 1998; Mark, Henry, & Julnes, 1999; Mark, Henry, & Julnes, 2000; Mark & Henry, 2004; Marks & Sykes, 2002) have been strong proponents of a realist (realistic) approach to evaluation, including systematic reviews.

According to Pawson and Tilley (1997): "The basic task of social inquiry is to explain interesting, puzzling, socially significant regularities *(R)*. Explanation takes the form of positing some underlying mechanism *(M)* which generates the regularity and thus consists of propositions about how the interplay between structure and agency has constituted regularity. Within realist investigation there is also investigation of how the workings of such mechanisms are contingent and conditional, and thus only fired in particular local, historical or institutional contexts." (p. 71)

A search for regularities in context-mechanism-outcome (CMO) configurations advocated by realist evaluators (e.g. per Pawson & Tilley, 1997) – generated through

principled discovery and competitive elaboration (Mark et al., 2000) – bears considerable resemblance to grounded theory development through a constructionist orientation (Crotty, 1998) to grounded theory development (i.e. resembling Strauss & Corbin, 1998) that is midway between objectivist (Glaser & Strauss, 1967) and constructivist (Charmaz, 2006) approaches. Critical realism as a basis for social science, its relationship to grounded theory, and the role of ontological and epistemological perspective in knowledge exchange research and theory development in evidence-informed public health practice is discussed further in the discussion section (i.e. a search for regularities among ontologically real objects, yet is epistemologically fallible, and judgmentally rational basis for realistic grounded theory development).

Figure 1 (page 16) presents a basic model including the major categories that was originally suggested for exploration. The figure presents an *a priori* conceptual ordering of the categories (Strauss & Corbin, 1998). Table 1 (page 17) presents a listing of sensitizing concepts that were used in the construction of the interview guide, and represent a starting mindset that the interviewer had when entering into discussions with respondents. The interview data, not the concepts per se however, provide the basis for the theory developed in this document. The Table in Appendix D also presents in more detail, the propositions that were developed *a priori* related to each of these categories, and their relationships (i.e. more detailed set of propositions about public health reality and context-mechanism-outcome configurations that might emerge through this research project). A description of the basic model (also developed *a priori*) is as follows.

Players and their roles. Tobacco control coordinators (TCCs) work daily in local public health agencies/organizations. These TCCs are principal contacts to the Smoke-Free Ontario Strategy funder (i.e. Ontario Government). They are expected to affect the interpretation of the requirements of grants and contracts and affect the execution of tobacco control organizations in Ontario (i.e. local boards of health and their public health agencies) who are mandated by provincial law (i.e. Health Protection and Promotion Act) to coordinate local execution of comprehensive tobacco control. Such execution of programs and services is to be informed by scientific evidence. Moreover, TCCs play a key role as "agents" for tobacco control implementation through organizational and social change mechanisms in Ontario public health units. Through public health agencies, TCCs are expected to affect broader structures and a social movement for tobacco control at the local level.

Organization and operating context. Public health agencies exist in municipalities across Ontario, and these are embedded in larger social, political and economic environments (e.g. partisan politics, tobacco growing areas, urban/rural, socio-economic bases etc.). They vary considerably in terms of their internal organizational structures and cultures. They vary also in terms of the programs and policies that they implement. This variation reflects, to some extent, their working knowledge and the expression of it in their work milieu (i.e. how they apply "know-how" and "know-what").

Public health agencies are local governmental organizations, involved in a wide variety of public health issues, with staff that have varied educational backgrounds and practice experience (some of which is limited to more narrowly-based and individually-directed biomedical interventions). This structural composition and experience affects organizational culture and decision-making. These structures, cultures, decision-making aspects, and practices are all subject to change.

Public health agencies are responsible for the health of residents in their public health units (i.e. defined populations within defined geographic areas). To exercise their mandate, public health agencies and their employees – including TCCs – must engage and work with community partners. This is a complex role.

Working knowledge. Working knowledge changes in response to internal and external contextual factors, including the input of information and evidence in many forms (as identified above). As knowledge is seen to be a socially developed phenomenon, it is created through a process of social construction (i.e. socially developed shared meanings/understandings).

Working knowledge is a broad term used to reflect covert psychological factors that are accessible and influential in daily work. As such it includes, but may not be limited to (a) perceived control, (b) attitudes towards various practices/behaviours (outcome expectations and evaluation of outcomes), (c) perceptions of cultural and other (e.g. legal) expectations (subjective normative beliefs), (d) motivations to comply with such expectations, and (e) perceptions of personal, proximal, and collective efficacy to act. Taken together, these aspects affect intentions, decisions and actions. All of the Aristotelian intellectual virtues (episteme, techne, and phronesis) that are also embraced by social cognitive and planned behavior (and reasoned action) theories (cf. Bandura, 1986; Bandura, 2001; Bandura, 2004; Ajzen & Fishbein, 2005) *will be reflected in the amalgam of working knowledge.*

Knowledge conversion. Working knowledge is developed through implicit and explicit means in organizationally and socially-situated experiences. Knowledge conversion contributes to working knowledge in organizations. In organizations, it will develop in four ways: (a) shared socializing experience (tacit to tacit experience), (b) externalization and social processing of linguistic tropes (e.g. metaphors, analogies, aphorisms, metonyms to convert tacit to explicit), (c) combination of explicit information (explicit to explicit) such as syntheses of empirical evidence and processing these into

socially constructed (interpreted for meaning in context) knowledge, and (d) internalization in practice patterns (i.e. learning by taking explicit knowledge and embodying it in practice) per Nonaka's theory of knowledge conversion which is seen as a model for the social construction of knowledge (Nonaka, 1994; Nonaka & Takeuchi, 1995; Nonaka & Konno, 1998). (Note: this study is concerned only with knowledge conversions (b), (c) and (d).)

Agency versus structure. Working knowledge is seen to be necessary but insufficient for TCCs to affect change within the structure of their public health agency and public health unit. The real interests/commitments of TCCs, command of and ability to mobilize resources, opportunities to act, and disposition to act will all affect TCCs actions[7]*. The efficacy and impact of the TCC agents will be dependent therefore on many factors.*

As working knowledge is not solely the purview of TCCs, their impact of public health strategies[8] *will be affected by the social construction of working knowledge across the public health agency and unit, internal and external demands/supports (including competing priorities), and the changes in practice, culture, and structure (habitus).*

Summary. In short, evidence-informed tobacco control practice in Ontario public health units is a locally-situated, socially-constructed sense-making activity that is integrated into the working knowledge and practice of many players. TCCs are putatively key agents of change. Under the proper conditions and with the right supports, they facilitate the use of evidence to inform the structure of policy and programs of health departments and organizations/communities that they engage. Moreover, effective public health practice is determined through a process of agent-structure interaction through time, mediated by and determining organizational structures and cultures. TCCs as agents can and do play an active role in affecting public health agency structures, cultures, and practices. Furthermore, their potential impact is beyond their employer and extends to organizations that they engage.

Understanding context-mechanism-outcome configurations related to TCC and other public health professionals' evidence-informed practice may generate realistic and pragmatic lessons that will lead to improved interventions to facilitate knowledge creation, use and application by, for and with key knowledge gatekeepers and those whom they engage.

[6]See also (Archer, Bhaskar, Collier, Lawson, & Norrie, 1998) particularly the chapter by Bhaskar (pp. 409-417) pertaining to human emancipation and the role of science.

[8] Public health strategies are direct programs and policies, and other actions (sanctioned and unsanctioned by the organization) such as media and policy advocacy working to influence structures of their own organization, community organizations, the media and political and legal institutions.

Figure 1: Basic realist model of major context-mechanism-outcome configurations

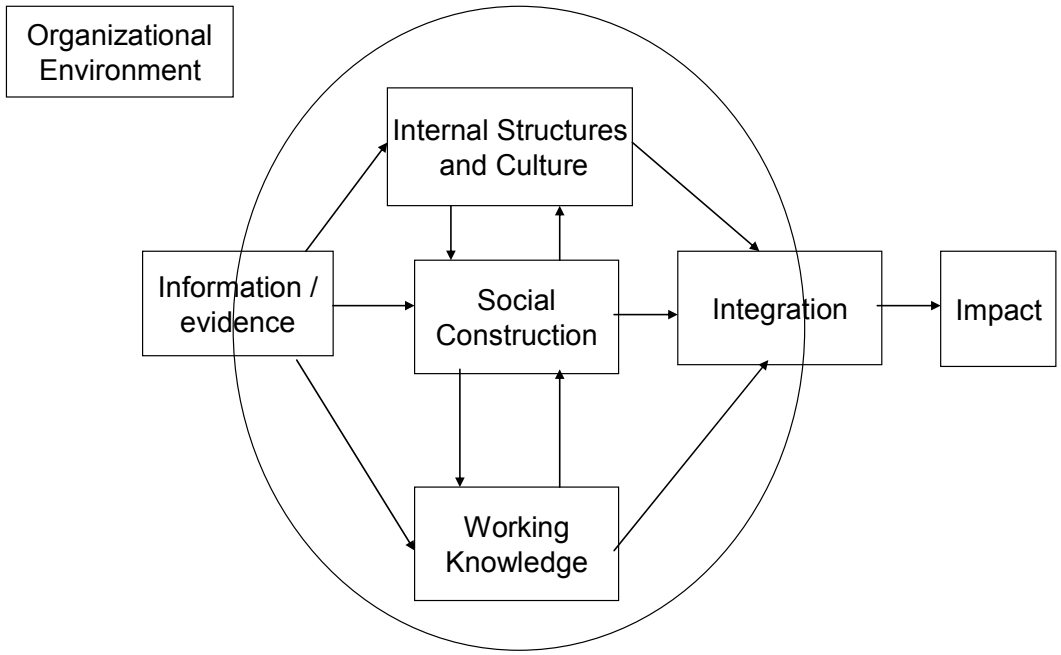

Table 1 – Sensitizing Concepts

1. ***Empirical evidence*** takes the form of scientific evidence (including systematic reviews, and scientific studies), community and population assessments, surveillance, service monitoring, evaluative research, and other empirical studies not yet identified. They constitute objective inputs to knowledge.
2. ***Technical assistance, training and reflective practice*** includes practical guidance, professional development opportunities, communities of practice/networks, technical inputs (including instructions), etc. This is an aspect of objective reality.
3. ***Background information*** is all other sources of information that are factored into decisions, including history, tradition, mandates, local sensibilities, accountabilities, imperatives, resource availability etc. that may be incorporated into decision-making.
4. ***Knowledge*** is the subjective judgment and interpretation of information and this takes the form of beliefs – i.e. control expectations about having the capacity to act organizationally (proxy and collective efficacy), self efficacy expectations about ability to engage effectively in action, and outcome expectations about the likelihood of outcomes that would achieved through action.
5. ***Working knowledge*** is organized knowledge in the minds of knowledge workers; information that is already processed psychologically, socially assembled and accessible for use (i.e. rapid access memory in one's head; not on a hard drive, file cabinet, bookshelf or desk). It may be correct, or not; but it is what is held subjectively by individual agents, and what is used in decision-making. It will include efficacy expectations, outcome expectations and evaluations, subjective normative beliefs, motivations to act, intentions, and expectations of control. As it includes values, it is broader than knowledge.
6. ***Practice*** is the behavioral/action-oriented aspect of programs, policies and services (i.e. objective actions in a specific context). It is action that can be socially observed to actually occur. It may be sanctioned (canonical) practice, or not (non-canonical).
7. ***Wisdom*** is an attitude towards one's own knowledge. It reflects commitment to a position, as well as openness to considering new information (e.g. empirical evidence, technical assistance and training, reflective practice, and other background considerations).
8. ***Knowing*** is dynamic process of justifying beliefs towards a truth. It might be a social or individual process.
9. ***Knowledge conversion*** is a dynamic organizational process of knowledge creation, exchange and transfer (based on Nonaka & Takeuchi, 1995). It is situated in organizational processes of socialization (tacit to tacit), externalization (tacit to explicit), combination (explicit to explicit), and internalization (explicit to implicit). These involve transfers among tacit and explicit dimensions, and are facilitated or impeded by situation-specific cultural contexts. All aspects may be observed and represented in the processes of social construction of knowledge in public health action systems.
10. ***Culture*** consists of conditioning, interacting and elaborating background information that shared and intelligible (i.e. operationalized as being known) to agents (e.g. per Margaret Archer's [Archer, 1996; Archer et al., 1998; Archer, 2000; Archer, 2003] morphogenesis of cultural systems). It is perceived inter-subjectively. It is not entirely structural, but represents social regularity.
11. ***Structures*** are the organizational mechanisms established to support/thwart (and/or are produced through) practice. They may be developed to produce, reproduce, and/or transform culture, knowing, and practice. They may be mechanisms that generate learning and, if so, are called organizational learning mechanisms. They are objective entities.

III. Study Rationale

A. Reasons for the study. The need to conduct a study to document and develop a grounded theory of evidence-informed practice in tobacco control has been identified above. Among the reasons for conducting this study are the following:

- the burden of chronic disease resulting from tobacco use and exposure;
- current interest in developing better practices of knowledge exchange to promote evidence-based decision-making in public health;
- the critical (and legally mandated) role that public health professionals in local boards of health play as stewards of resources and collaborators within the local public health agencies and with external community partners to affect the implementation of tobacco control;
- little is known about how tobacco control coordinators and other public health professionals use evidence and other sources of information in their decisions and practice;
- recognition that information is not sufficient to change behavior of complex systems; and
- while recognizing that social contextual factors can be powerful and sometimes overriding determinants of agent efficacy, people do make a difference; and, TCCs as agents can (and do) affect change in practices of complex social systems in line with (or at least informed by) evidence.

B. Three inter-related purposes. This study has three inter-related purposes. At the outset, it was anticipated that this study would:

- develop a theory of evidence-informed practice in an important public health action system[9] – focusing on the social construction of knowledge and policy/program reality of tobacco control at the local level (contribution to social science knowledge);
- make a practical contribution to improve the performance of public health system through a better understanding of the role of knowledge workers and how they can be better

[9] The term "action system" was used initially to define the unit of analysis to be inclusive of activities by organizations that may collaborate with local PHAs within local PHUs.

supported by policy, strategies for knowledge exchange within public health, mass communications, research institutions, evaluation and monitoring, and funders etc. (contribution to public health practice); and,

- make a contribution to methods development for social inquiry and evaluative research in other areas of knowledge exchange-related research and practice (contribution to social inquiry and evaluation practice).

C. Research Questions. While the primary interest is to develop a grounded theory, essentially a realistic account of the factors affecting evidence-informed tobacco control in Ontario public health units, it was thought helpful to identify a few questions that could be used to guide the overall data gathering and synthesis exercise. The research questions to be addressed were as follows:

1. Overarching research question

- How do tobacco control coordinators as putative change agents and stewards of tobacco control resources, and other public health professionals, within their public health action systems incorporate new sources of information/evidence into the working knowledge and practice of tobacco control (through which mechanisms and in which contexts)?

2. Specific research questions

- For TCCs and other public health professionals, what are the roles of the following sources of information in working knowledge development and practice? Sources include:
    - empirical evidence of various forms
    - technical assistance and training
    - reflective practice and experience
    - communities of practice
    - background information of various forms
    - knowledge conversion in the organization
    - public health agency culture

- ❖ public health agency structure
- ❖ community partners
- ❖ political, economic, technological, and/or social external factors

- ➢ What are the various forms of knowledge use in public health agencies? How does use occur in these ways?

- ➢ How do organizational learning mechanisms and other aspects of the organization (i.e. context, policy, culture, and psychological aspects) in public health affect access to information, and development, exchange and use of working knowledge by TCCs and others (including use by colleagues, organizational structures)?

- ➢ What are the key action systems in local tobacco control? How are these action systems linked to the construction and use of working knowledge?

- ➢ Do TCCs and other public health professionals attempt to ensure that tobacco control is institutionalized or otherwise sustained in their organization and/or in community and partnership arrangements? If so, how? What factors influence (i.e. facilitate or constrain) this process?

- ➢ What advice do public health professionals have to offer vis-à-vis the support that they should receive from system-level structures (i.e. at regional, provincial, or national levels) to enhance practice within their local public health action systems?

IV. Methods

A. Overview. This study sought to understand how evidence is used by key knowledge workers in Ontario's public health system through a grounded theory approach based on in-depth, intensive, semi-structured qualitative interviews supplemented with other data sources (field notes and documents). It explored structures and mechanisms affecting how knowledge workers acquire, develop, and apply working knowledge in public health roles and settings that are pivotal in the implementation of a Smoke-Free Ontario strategy. Factors that facilitate and/or impede such practice were to be considered.

The study perspective was based on a critical realist ontology (i.e. existential intransitivity and denial of epistemic fallacy, characterized by generative mechanisms, stratified reality). Epistemologically, the orientation was to be based largely on inductive emergence of key generative mechanisms from data gathered, with empirical confirmation of propositions derived through the research and analysis process. The primary method used was qualitative grounded theory analysis (texts based on intensive interviews, field notes, and documents) – i.e. emergent inductive inference. However, this was supplemented by a review of a variety of propositions that were specified *a priori*, a review of social theories and concepts that could be confirmed by the data, and a limited member check (i.e. confirmation through deductive inference). Additional reflection at the analysis stage added an investigator's historical hermeneutic dimension (Gadamer, 2004a; Gadamer, 2004b) to the analysis, i.e. as a project in which the investigator and investigated are historically thrown and understood.

The primary data source was in-depth interviews of key informants (TCC and other public health directors and managers) in a limited set of public health agencies and health units in Ontario. This was supplemented by documents and field and reflective notes obtained prior to, during or following the interviews.

B. Ethics approval. Approval from the University of Waterloo, Office of Research Ethics was sought and received prior to all interviews. Prior to interviews, informed consent forms were completed as a condition of study participation by everyone interviewed in person and/or over the telephone. This included permission for the following: participation in the interview, audiotape recording of the interview, taking of field notes, use of non-attributed quotations in future reports, and follow-up as necessary.

C. Sampling.

1. Cases. The case study approach used in this project is a holistic, multiple case design (Yin, 2003). In this instance, as the focus of the study was on the development of a generalized theory of evidence-informed practice of tobacco control in Ontario public health agencies, it was decided that a variety of cases should be used to construct the theory and factored into the grounded theory approach used for analysis of data. Therefore, a multiple-case "replicated" design per se was not used (cf. Yin 2003; pp. 46-53). Rather than developing the theory on the base of a single index case and subsequent comparisons of cases to this indexical case, the data from the three cases were taken together and analyzed using the constant comparative method (Glaser & Strauss, 1967; chapter V) to develop the general substantive theory. It was necessary that there be differences amongst the cases and these differences had to be accommodated within the general model developed in this project. Therefore, it was necessary to select cases so that there would be a maximum chance for differences among the cases. Differences could be described in the findings.

Cases were local tobacco control action systems in public health units in Ontario, including key agents (TCCs, medical officers, directors and others) within local public health agencies. Documentation for these cases came from four key informants in each selected PHA. (See findings below.)

2. Case selection. Three PHAs in three PHUs (cases) were selected at random from within 3 broad classes of PHU within in the Province of Ontario. These classes of PHAs (i.e. public health agencies, the official agencies created by local boards of health

pursuant to the *Health Protection and Promotion Act*) and associated PHUs (i.e. public health units geographic areas) were: (a) serving as centres for Tobacco Control Area Networks (TCAN) or were part of the Public Health Research, Education, and Development Program (PHRED); (b) not at TCAN/PHRED, but considered to be "innovative" by virtue of the fact that they had passed and implemented a gold standard bylaw (100% smoke-free tobacco control bylaws, extending to restaurants, bars, bowling alleys, billiard and bingo halls, had no designated smoking area, and had placed the onus on proprietors to enforce the law) before 2003 in at least one municipality within the public health unit and had received funding under the first round of Youth Action Alliance (YAA) innovation grants for 2004/05; or, (c) others, i.e. if they did not fall in either of these two prior categories.

Due to concerns about demand characteristics, it was decided (under the guidance of the thesis committee) to proceed to contact one of these three cases at random, conduct an initial set of interviews and then proceed to contact the others after reflecting on the interview format. See the discussion below about demand characteristics, i.e. subsections about interviews and field and reflective notes.

The investigator's judgments about how to categorize each of the public health units and agencies into the three classes were made in consultation with a former manager of the Smoke-Free Ontario Health Unit, Health Promotion Branch, Ontario Ministry of Health Promotion (Melody Roberts). She was aware of the outcome of the YAA competition and grants made by the Health Promotion Minister. At that time, we also consulted documentation from the Ontario Tobacco-Free Network pertaining to the "Standards of Second-Hand Smoke Exposure in Ontario Hospitality and Recreational Premises" (downloaded from http://www.theotn.org/GoForGold.htm on March 4, 2007).

3. Key informants and the initial contact with cases. Medical Officers of Health are the chief executives and administrative officers of the local boards of health. Therefore, in approaching public health agencies (PHAs) it was critical to have the support and buy-in from medical officers in order to conduct this study. The medical officers and the

tobacco control coordinators were therefore considered the initial primary point of contact with PHAs.

The list of all local boards of health, PHAs and medical officers was identified from a public source (i.e. the internet website of the Association of Local Public Health Agencies).

Initial contact was made via telephone with medical officers, the study was explained, and permission requested to interview their staff on a voluntary basis during work time. All medical officers contacted were very open and agreeable to participate themselves, agreed to permit their staff to participate voluntarily, and assisted in identifying other key informant contacts in the PHA. Their participation was confirmed by the investigator through sending an information and consent letter that was signed and returned. Subsequently, contacts with other key informants in each PHA were made first via telephone (i.e. based on information provided by the medical officer or her/his office) and subsequently via an information and consent letter (distributed electronically via email and requesting a fax returned to indicate agreement to participate).

TCCs are the professionals recognized by the Ministry of Health Promotion to have lead responsibility in local PHAs for the development of tobacco control interventions, including policy and programmatic activity. (A list of TCCs was provided to the investigator by staff of the Ministry of Health Promotion. However, this was used only as background information.) Medical officers in each instance identified the TCC as a key informant without prompting (although one was in the midst of a job transition, see results section).

The medical officers were asked to identify others in their PHA most knowledgeable about comprehensive tobacco control in their public health unit. It was expected at the outset, but not necessarily, that two (2) additional key managers or directors in the health unit would be identified – likely a director of public health nursing or chronic disease prevention and a director of environmental health or public health inspection.

Four (4) interviews per PHA/PHU were to be conducted therefore for each case – i.e. medical officer, TCC, and two others. The data gathering was to be limited to health department staff, as the focus was largely on how they practice evidence-informed tobacco control in their unit (i.e. even though this implies that they must relate to external partners for a great deal of their practice).

4. Theoretical sampling. Theoretical sampling is the key consideration in the qualitative case selection. With respect to theoretical sampling, Glaser and Strauss (1967) suggest that "the basic properties of a category are … brought out by similarities, by a few important differences found when minimizing group differences. It is helpful to establish these properties before differences among groups are maximized" (p. 55). In this study, there was an attempt to gather interview data from as diverse a set of health units as possible, within realistic limits of time and resources. The analysis proceeded by analyzing the interview data within each case (i.e. four interviews per case at a time) and then moving on to subsequent cases to examine data relevant to each category and sub-category.

Each public health action system may be considered to be a complete study in itself. As discussed by Yin (2003), the convergence and consistency of evidence across cases provides evidence of replication and validation of the findings. At the outset, it was considered important that the cases selected be sufficiently well documented to provide insights into the underlying generative mechanisms and to yield some understanding of variation and similarities amongst the cases.

As already noted, three public health actions systems were selected for study, chosen at random from each of three groups of PHA-based tobacco control action systems: (a) PHA that is a Tobacco Control Area Network/Public Health Research Education and Development (TCAN/PHRED) PHA; (b) PHA that had a 100% smoke-free bylaw and was involved in the initial round of the youth action alliance grants SFB/YAA (suggesting that they may also be innovative); and, (c) the last which is neither a TCAN/PHRED or SFB/YAA.

The random selection is not for representative sampling, but offered a rather straightforward explanation of the rationale as to why a particular PHA was chosen – i.e. with equal chance in the class. At the outset, the first two cases were considered to provide for cross validation (or not) and the third was to serve to draw out differences that may not be apparent among leading or sophisticated public health action systems or confirm findings from the first two to be potentially generalizable across a wider range of cases.

It was also anticipated that for theoretical saturation, the number of interviews and/or public health agencies may need to be increased. At the outset, it was anticipated that in-depth interviews from 4 respondents in each of the 3 health units (i.e. 12 in-depth interviews) – appropriately supplemented by field notes and review of relevant documents – would be sufficient to develop a well elaborated theory based on thick descriptions of the three cases. As noted in the results section, this was confirmed through the analysis of the interview and other data.

D. Qualitative interviews, field notes, and documentation.

1. Interviews. Through the conduct of intensive semi-structured interviews with TCCs and other key informants in a limited number of PHUs, a grounded theory of key factors associated with the issues in Figure 1 and Table 1 was to be constructed. The interview guide used in this study is included as Appendix F.

Demand characteristics are pervasive and sometimes subtle influences in human interaction generally and social psychological research in particular (Orne, 1962; Orne & Whitehouse, 2000). The extent and nature of demand is determined by particular contexts of social interaction.

The investigator was aware that, for some respondents, his reputation for having been involved in tobacco control and public health in Ontario preceded him. Early in the interviews, so that guessing about hypotheses of the study and social desirability of

responses would be minimized, the investigator (also the interviewer) made it clear that he had no expectations about what the respondents would tell him and that there are no correct or incorrect answers. Furthermore, it was stressed that the interview was confidential, frank discussion would be appreciated, and confidentiality and anonymity would be protected and respected.

Moreover, the purposes of the study were described as three fold (per above) vis-à-vis social science, practice, and methods contributions. The interviewer stated that he had no vested interest in simply affirming his current ideas. To the contrary, the purpose of the study was described as the development of a realistic theory, and that a solid, well grounded understanding of what is actually happening in public health action systems for tobacco control was necessary. Through such understanding, it was explained that the system for tobacco control would be enhanced to better support public health professionals and community-based agencies to implement effective interventions. Honest, direct, professional responses were requested from all respondents.

The interviews were conducted by the principal investigator, as this study was based on an emergent inductive method of theory development. Theoretical sampling during the interview was thought to be possible if the interviewer was nimble in questioning and the respondents were open to discussing their experience, events and putative generative mechanisms of organizational learning and the social construction of knowledge in their work contexts.

Ideally, the interviews were to be face-to-face, but may have occurred over the phone if needed due to scheduling problems or inclement weather. It was anticipated that each interview would take approximately 60 to 90 minutes. Based on the distinctions offered by Patton (2002), the interviews started in an open conversational interview format and finished with a semi-structured interview portion to ensure that all "sensitizing concepts" that relate to the research questions were discussed during the interview. (Please see Appendix F for the interview guide).

With permission of the interviewees, the interviews were to be audio-recorded and field notes were to be taken during and immediately following the interviews. Permission was sought for follow-up after telephone interviews, i.e. if clarification was needed during the analysis and to ensure that theoretical sampling could be completed to the point of theoretical saturation. In addition, permission was sought for non-attributed quotations to be used.

2. Field and reflective notes. Field notes were also taken during interviews and were also made as soon as possible following interviews. Additionally, the investigator developed field notes throughout the conduct of the study in the form of memoranda. Field notes were used to document non-verbal cues, key phrases, insights, ideas, and beginning interpretations to be used (potentially) in subsequent data coding and analyses (Patton, 2002).

Reflective notes were also used to explore aspects of the interview after leaving the interview. In particular, reflections were documented in the following areas: (a) Does this/that question generate responses that are expected? (b) Does it generate responses including non-verbal cues and what does this mean? (c) To what extent do I think that the responses are biased on the basis of social desirability, or other demand characteristics? (d) Could the questions be posed in another way that would reduce demand characteristics? Reflections on the interview format and consultation with the thesis committee chair and another member informed the decision to proceed with the completion of all interviews as planned (see results).

3. Documentation. The investigator considered meeting with key staff of the Ministry of Health Promotion and requesting access to proposals submitted to the Smoke-Free Ontario Unit as part of the annual cycle of program grant applications and funding. In addition, the investigator considered meeting with the staff of the Public Health Division, Ministry of Health and Long Term Care and request documentation provided by health departments about the structure of their health agencies. These documents could also have also been accessed by filing a request to the government under the Freedom of

Information and Protection of Individual Freedoms Act, Section 10.(1). However, the thesis committee advised that this was not desirable, as the investigation should be conducted in a cooperative and voluntary matter, seeking to develop and maintain a productive working relationship with the public health agencies and the Ontario Government. Therefore, material relevant to the analysis was requested voluntarily from the PHA staff directly. Basic supplementary unobtrusive information was also requested from the MHP or found on the world-wide web.

There was good cooperation from the PHAs in providing additional illustrative material. From the Ministry of Health Promotion, basic unobtrusive information about the size of the workforce in tobacco control and in chronic disease prevention for all PHAs and the province as a whole was obtained. Unobtrusive information on population, geographic size, density of population, urban/rural mix, and smoking related statistics were obtained from Statistics Canada sources (i.e. Census and Canadian Community Health Surveys).

4. Additional theoretical sampling as required. A "grounded theory method" was used (Charmaz, 2006; Dey, 1999; Glaser & Strauss, 1967; Strauss & Corbin, 1998). It was assumed that from this approach a new theory would emerge: – i.e. through an inductive analytical process, it would be possible to generate the theory. This theory would emerge through the analysis of data gathered and the interpretation of patterns in data (i.e. not simply informed by the initial views of the inquirer). As discussed in a previous section, based on theoretical sampling needs, additional interviews would be considered as needed. However, this was deemed unnecessary.

E. Data analyses. Data analyses were completed in a manner appropriate to the four types of data gathered. Textual analyses were used for the interview data, field notes and documents. Further detail is provided below. The findings section documents the process sequentially, including key decision points in the research and analysis process (e.g. reflections on initial interviews and decision to proceed with all interviews).

The audio-tapes from interviews were transcribed verbatim. Field notes and relevant documentation were entered into electronic files as needed (e.g. reflective notes, sequential process documentation, decisions taken etc.).

The general analysis strategy was as follows, based on the constant comparative method as discussed by Glaser and Strauss (1967) and adapted for this inquiry: initial coding (phase 1), integrating and elaborating the categories (phase 2), preliminary delimitation of a theory based on principles of parsimony and theoretical saturation (phase 3), integration with social theories and reflections on propositions developed following the review of literature (phase 4), checking back with members about the credibility of the theory and thick descriptions based on the theory (phase 5), and creating a summary, including reflection and answering the research questions.

An initial review of the data was conducted using paper and pencil. Categories were established as free nodes and the data were coded using NVivo (N7). Bazeley's book was instructive (Bazeley, 2007). This is referred to as *Phase 1* analysis.

Subsequently, the initial categories were expanded and reorganized into a tree structure for parsimony, with branches, sub-branches, and twigs using NVivo 7. This is considered the *Phase 2* analysis. Following Strauss and Corbin's suggested coding strategy of open, selective and axial coding (Strauss & Corbin, 1998), it was anticipated that the model would be explicated and revised through these initial analysis phases (i.e. phases 1 and 2). Using Lofland and Lofland's (1995) suggestions for developing analysis, the following aspects were considered as the open coding developed: type, frequency, magnitudes, structures, processes, causes, consequences, and agency (Lofland & Lofland, 1995). Additional synthesis of the categories was achieved by the further close inspection of subcategories and original data in each category. Each of these was described based on the interview transcripts, documentation and field notes.

Phase 3 analysis involved the articulation and drawing of a general framework and preliminary theory which provided an overall logical schematic representation of the relations among the major (branch-level) elements of the theory and several more specific

models that depict relations among key elements (i.e. at the sub-branch and twig level). This analysis took the form of one general figure and five specific figures explicating relations amongst the categories and sub-categories.

Phase 4 analysis involved the review and presentation (in the form of a matrix) of close to twenty social theory elements and concepts that are potentially relevant to the construction of a social theory of evidence-informed practice in tobacco control in Ontario PHAs. In addition, the investigator and analyst reviewed the model by reflecting on the original (*a priori*) propositions to determine if additional categories might be added to the theory before making a final commitment to it. Reflection on these relative to the original model led to a minor addition to the model.

Phases 5 analysis involved the reconstruction of the original cases, i.e. documenting each case using information from the data assembled and describing the major categories and subcategories of each PHA case, followed by a limited check with selected members. The member check was used to assess the credibility of the overall model and to determine if the theory resonated with the TCCs (or closet member in one case) in each of the PHAs based on their case specific documents. Presentations were also to be made to the Technical Assistance and Training Subcommittee of the Smoke-Free Ontario strategy's Community Action Working Group and to staff of two Ontario Government Ministries (Ministries of Health Promotion and Health and Long-Term Care). Verbal feedback was also to be requested immediately following presentations to validate or suggest modifications to the analysis. Due to scheduling problems, there was only informal feedback from staff of the Program Training and Consultation Centre and staff of the Ministries of Health Promotion and Health and Long-Term Care. At that time, there was also to be an assessment of reactions to the documented suggestions for "additional supports from regional, provincial and national levels".

In the discussion section, there are answers to the original research questions and discussion of the differences amongst the cases and implications of the differences for grounded theory development.

F. Other

1. Resources and Timeline. The Ministry of Health Promotion approved funding to the Ontario Tobacco Research Unit (as part of the base grant for the 2006/07 to 2008/09) for a special study of the use of evidence in the tobacco control strategy which was used to support this study. The project was conducted by the investigator as part of his duties as Director of Knowledge Exchange and Systems Evaluation with the Ontario Tobacco Research Unit. Administrative support was provided by Michele Poirier, Administrative Assistant for the Evaluation Team, for the confidential transcription of interviews. As noted above, Melody Roberts, Manager of Knowledge Exchange and Planning at the Ontario Tobacco Research Unit and former manager of the Smoke-Free Ontario Unit assisted the investigator to sort PHUs into three categories before the random selection of public health units was made.

The Ph.D. thesis committee comprised of Drs. Roy Cameron, Paul McDonald, Susan Shaw, and Barbara Riley approved the proposed research approach, with some guidance and modification, following a thesis defense presentation and discussion (defended on February 14, 2007).

Final ethics approval for the study was granted in April 2007. Interviews were conducted during May 2007. Transcriptions were produced during May and June for analysis commencing in July 2007. Further analyses and writing occurred throughout the balance of 2007 for defense of the thesis in early 2008.

2. Management and Conduct of the Study. As expected, the investigator directed all aspects of this study. He was principally responsible for the preparation of materials submitted for ethics reviews pertaining this project, for the actual conduct of the qualitative interviews, transcription, coding, analysis, writing, presentation and defense of the final thesis (given the advice of course of his supervisor and members of the thesis committee).

V. Findings

A. Overview.

This section starts first with a brief description of the sample including the selection of cases and, the basic characteristics of the PHAs and their associated PHUs. Second, the experience with the initial set of interviews and the decision to proceed with additional interviews, as planned, is discussed briefly. Third, the interviews are described vis-à-vis the positions of the interviewees as well as length and location of interviews, and resulting textual transcriptions. Fourth, the potential for demand characteristics and reflections on the initial and subsequent interviews are then presented. Fifth, the analysis of the interview, field note, and documentation data is presented. This was developed in six phases as follows:

- Phase 1 analysis – initial coding;
- Phase 2 analysis – integrating and elaborating the categories;
- Phase 3 analysis – preliminary theory;
- Phase 4 analysis – integration with social theories and reflections on propositions; and,
- Phase 5 analysis – validation through member checks.

Last, the advice provided by interviewees about additional supports to facilitate tobacco control efforts in public heath units were separately summarized. These are presented at the end of this section.

In the discussion section, there are answers to the original research questions and discussion of the differences amongst the cases and implications of the differences for grounded theory development.

B. Sample

1. Selection of the cases. As described in the methods section, this study was based on a holistic, multiple case design (Yin, 2003). Three cases were selected at random from within three broad classes of PHUs in the Province of Ontario. PHUs (i.e. geographic areas and associated populations) are served by PHAs (i.e. the official agencies created by local boards of health pursuant to the *Health Protection and Promotion Act*). Staffs in

three PHAs (i.e. four staff per PHA) were interviewed and the three classes of PHAs and associated PHUs were as follows:

(a) Those serving as centres for Tobacco Control Area Networks (TCAN) and/or were part of the Public Health Research, Education, and Development Program (PHRED) – i.e. had been granted funds by the MHP and hired staff for either TCAN coordination or a PHRED centre (or both);

(b) Those not directly housing a TCAN/PHRED but were nonetheless considered to be "innovative" by virtue of the fact that (i) they had passed and implemented a gold standard bylaw (100% smoke-free tobacco control bylaw, extending to restaurants, bars, bowling alleys, billiard and bingo halls, had no designated smoking areas, and placing the onus on proprietors to enforce the law before 2003 in at least one municipality within the PHU), and (ii) they had received funding under the first round of Youth Action Alliance (YAA) grants for 2004/05; or,

(c) Others (i.e. they did not fall in either of the two prior categories).

The judgments to categorize each of the PHUs and agencies into the three classes were made in consultation with a former manager of the Smoke-Free Ontario Health Unit, in the Chronic Disease and Health Promotion Branch, Ontario Ministry of Health Promotion (Melody Roberts). She was aware of the outcome of the YAA competitions and grants made by the Health Promotion Minister. At that time, we (i.e. Melody Roberts and the investigator) also consulted documentation from the Ontario Tobacco-Free Network pertaining to the "Standards of Second-Hand Smoke Exposure in Ontario Hospitality and Recreational Premises" (downloaded from http://www.theotn.org/GoForGold.htm on March 4, 2007).

For the group of TCAN/PHRED PHAs and units, there were 8 identified. Among the "innovative" PHAs and units, there were 6 identified. This left 22 PHAs and units that remained in the "other" category.

Subsequent to and separate from the classification exercise, the three PHAs/units were selected at random by the investigator from a hat filled with numbers associated with health units in each class.

The basic characteristics of the PHAs and units are presented in Table 2. Please note that the selection of cut points as presented in the table that relate to population, staffing, and smoking trends were deliberately chosen so as to ensure anonymity of the participating interviewees. Therefore, the reader is encouraged to interpret the table with considerable caution, as it is intended to give only a general sense of the characteristics of the PHAs and the associated units.

Smoke-Free Ontario Strategy staffing of these PHAs represents slightly less than 6.5% of all fulltime equivalent positions funded by the province; and, the PHAs represent about 8.3% of all health agencies in the province (i.e. three of 36).

As the last PHA is clearly in a rural PHU, from this point onward in the thesis it will be frequently be referred to as the "Rural" PHA. Taken together, the TCAN/PHRED PHA, the Innovative PHA, and the Rural PHA provide three interesting and diverse health agency structures and geographic service units. They represent Urban, Mixed Urban/Rural, and Rural PHUs.

Table 2 – Basic Demographic Characteristics of Selected Public Health Agencies and PHUs with Province-Wide Comparison

Characteristics	PHRED/TCAN	Innovative	Other	Province of Ontario
Urban / Rural	**Urban**	**Mixed**	**Rural**	**Province**
Resident population 2006	> 500,000	< 500,000	< 100,000	12,160,282
Growth since 2001	Slightly increased	Increased greater than provincial average by more than 2%	Decreased < 2%	Increased 6.6 percent
Land area in square kilometres	< 1000 sq km	> 1000 sq km	> 3,000 sq km	907,574 sq km
Population density per square kilometre	> 1500 people per sq km	< 500 people per sq km	< 50 people per sq km	13.4 people
Percent of population living in a city or town	100%	> 85%	< 15%	
Smoke-Free Ontario Strategy funded staff positions (as full time equivalents)	~ 25 FTE	~ 10 FTE	~ 6 FTE	> 650 FTE
Mandatory Chronic Disease Prevention Program funded staff positions (as full time equivalents)	< 250 FTE	~ 18 FTE	~ 10 FTE	< 1100 FTE
Smoking in vehicle when child present	lower	lower	higher	~ 8%
Prevalence of current smoking (age 12+ years)	lower	lower	about same	~ 20%
Trend in prevalence 2000/01 to 2005	> 3% decline	> 7% decline	< 2% increase	~ 4.3% decline

Sources: Ontario Government estimates of staffing, Canadian Community Health Survey current smoking prevalence estimates for 2000/01, 2003, and 2005; and Statistics Canada population related census division estimates available at www12.statcan.ca/english/census06/data/popdwell/Table.cfm?T=304&PR=35&S=1&O=A&RPP=10 (accessed on July 15, 2007).

2. Initial set of interviews. The Association of Local PHAs website provided a listing of current contact information for medical officers of health (and board of health chairs) for all Ontario PHAs. This website (http://www.alphaweb.org) was used to identify the names and telephone numbers of local medical officers for each PHA identified.

One agency was selected at random (from among the three) to be the first PHA to be interviewed. It was decided to first approach one PHA, complete an initial set of interviews and reflect on the interview questions and interview process and make course corrections if needed. All personal contacts with the PHAs were made by the investigator himself, with the exception that the investigator's administrative assistant forwarded confidential electronic versions of the information and consent letters to the prospective interviewees.

Contact was made initially with the medical officer of health. The purpose and method proposed was described and discussed, and permission sought verbally and in writing to contact additional staff in his or her health unit to seek their voluntary participation in the study on work time. After receiving confirmation, the investigator followed up with individuals whose names were suggested by the medical officer.

Consent forms were signed before each interview. These consent forms essentially acknowledged: understanding of the nature of the study, particularly its confidential and voluntary nature, ability to withdraw consent, ethics clearances provided by the University of Waterloo Office of Research Ethics, how to contact the investigator or Office of Research Ethics with any concerns, agreement to have the interview audio recorded and anonymously quoted in any thesis or publications coming from this study, as well as any follow-up needed.

There was very good and full cooperation from the first PHA. There were no apparent major problems with the interview format, including no obvious concerns about excessive demand characteristics (discussed below). Therefore, following consultation with the chair of the thesis advisory committee and the investigator's supervisor, and one

other member of the committee (B. Riley), it was decided to proceed to contact the remaining two PHAs.

3. Proceeding with remainder of the interviews. The original plan, as discussed above in the methods section, was to interview senior people in each PHA who were knowledgeable about local tobacco control, particularly within the local PHA. Local tobacco control action systems are the systems of PHA and local partner tobacco control activity within the local PHU (i.e. within the geographic area that the agency has responsibility). Moreover, it includes activity by other partners and organizations engaged in tobacco control locally.

The plan for interview data collection was to conduct face-to-face interviews of 60 to 90 minutes in length with each of four senior people in each of the three PHAs. The positions targeted for interviews were local tobacco control coordinators, medical officers, directors of chronic disease prevention, and directors of environmental health and enforcement. People in these positions were targeted for interviews, as they are the people primarily responsible for the coordination of tobacco control in the PHA (i.e. tobacco control coordinator), the director responsible for chronic disease who would ultimately be accountable for smoking cessation and primary prevention activity, and the director ultimately accountable for the enforcement of provincial tobacco control legislation, as well as the chief executive (i.e. medical officer of health) in each PHU.

It was hoped that senior staff most knowledgeable about tobacco control related decision-making and practice would be identified and agree to participate. The general hypothetical structure of the four positions did not match reality in any of the PHAs; although, very knowledgeable (perhaps most knowledgeable) senior staff were identified and did agree to participate in all selected PHAs. Furthermore, there was excellent cooperation in setting up and completing the interviews.

C. Interviews

1. Overview. All interviews were conducted face-to-face in confidential locations, on site in the PHAs. In all but two instances, interviews occurred in the interviewee's office, behind a closed door. In the other two instances, private board rooms were used.

In the TCAN/PHRED PHA, the structure of the PHA was evolving. Nonetheless, interviews were requested with the medical officer, director of chronic disease prevention, a manager of environmental health responsible for *Smoke-Free Ontario Act* (SFOA) enforcement and compliance strategies, and the manager leading the development of a comprehensive tobacco control strategy within the agency. There was some variation from this request as follows.

In the Innovative PHA, interviews were conducted with the manager responsible for tobacco control, a health planner who had considerable experience with coalition partners including the interface with advocacy activity of the local council but no longer working in tobacco control, a manager responsible for the successful implementation of a gold-standard smoke-free bylaw and now a consultant to the manager of tobacco control, as well as the medical officer of health.

In the Rural PHA, the medical officer of health shared duties and responsibilities with an executive director. The executive director was an experienced public health professional with a nursing background and the two of them decided that they wished to be interviewed together. Further, in this PHA the tobacco control coordinator was in the midst of a job transition. Therefore, interviews were offered with this individual's supervisor who at that time was essentially doing the tobacco control coordinator's job, in addition to fulfilling to her/his senior management role. The enforcement officer was also open and agreeable to meet and share her/his experience with bylaw and SFOA enforcement.

Therefore, 11 confidential interviews were conducted with 12 public health professionals in three separate PHAs. These interviews occurred in six different building locations

(three for the TCAN PHRED PHA, two for the Innovative PHA, and one for the Rural PHA).

In preparation for each interview, the interviewer reviewed research questions, sensitizing concepts, the basic realist model of major context-mechanism-outcome configurations, and the interview guide. All interviews were conducted face-to-face in person by the investigator during a personal visit to the PHAs.

All interviews were audio-recorded (with permission) using a digital recording device, downloaded, and confidentially transcribed by the investigator's administrative assistant at the Ontario Tobacco Research Unit. A summary of the interview dates and lengths of the interviews and transcripts are included in Table 3.

Interviews were conducted during the month of May 2007. All interviewees were very open and willing to participate in the interviews and were very generous with their time. Interviews averaged just less than 90 minutes in length, but ranged from about 71 minutes to 113 minutes in length. While there were several commonalities in perspectives, as noted below in the results and discussion sections, each interview yielded unique and valuable insights. Furthermore, there was an apparent consistency across interviews with PHAs demonstrating a shared stock of knowledge about the PHA and how tobacco control was practiced within the PHU.

Table 3 – Description of Interview Locations, Dates And Lengths of Interviews and Transcripts

Interviewee	Location	Date	Length of Interview (minutes)	Transcript Word Count	Transcript Page Length
Tobacco Control Manager	TCAN / PHRED PHA	May 8, 2007	103.27	15,634	31.75
Healthy Environments Manager	TCAN / PHRED PHA	May 11, 2007	70.48	11,373	23.50
Medical Officer	TCAN / PHRED PHA	May 11, 2007	70.50	11,978	23.00
Chronic Disease Prevention Director	TCAN / PHRED PHA	May 22, 2007	98.40	16,781	35.25
Tobacco Control Manager	Innovative PHA	May 29, 2007	100.34	16,156	32.50
Health Planner	Innovative PHA	May 29, 2007	81.28	14,962	29.50
Medical Officer	Innovative PHA	May 29, 2007	84.55	15,600	26.00
Healthy Environments Manager	Innovative PHA	May 29, 2007	72.07	10,998	21.50
Executive Director and Medical Officer	Rural PHA	May 31, 2007	112.67	18,223	43.50
Enforcement Officer	Rural PHA	May 31, 2007	97.35	21,979	38.00
Healthy Environments Director	Rural PHA	May 31, 2007	85.50	14,663	26.50
Total			**976.40 minutes (16.27 hours)**	**168,347**	**331.00 pages**
Average			**88.76 minutes (1.48 hours)**	**~15,304 words**	**~30 pages**

2. Demand characteristics and the structure of the interviews. Paper and pencil notes were made following contact with individuals to set up the interviews and again following the interviews. Any points of interest at the time were subsequently recorded as memoranda in the NVivo7 project record in the form of initial reflective notes or in the form of post initial contact notes.

3. Initial contacts with the first public health agency. During the initial telephone contacts with the medical officer and staff of the TCAN/PHRED PHA, several points were noted as follows. The medical officer agreed to participate, requested that the letter to be sent to his/her attention, indicated he/she would share the information and consent letter with senior staff, and get back to the researcher with names of prospective interviewees.

During the initial phone contact, he/she also noted that the structure of the PHA is complex and evolving. There was interest in being sensitive to community needs (citing an example of a cessation program for a particular population group that was under development). It was also noted that the nature of decision-making is complex and evolving in response to recently developed provincial government leadership. It was also suggested that decision-making was fairly circumscribed by the Ministry program, but that his/her department had a long history of tobacco control.

The response to the information letter was very prompt, within 48 hours, providing the names of other senior staff to contact.

The senior staff was similarly open and started to discuss issues on initial contacts that were expected to come up during the interviews. These included:

- the departmental leadership team working on common goals and objectives,
- "looking at the big picture",
- leading and integrating a strategy of comprehensive tobacco control,
- applying strategic, program and project management principles,
- difficulty in changing directions in a large complex organization with the "magnitude, scale and complexity of the organization" such as theirs ("akin to turning the Queen Mary" and it "sometimes feels like herding cats"),
- integrating aspects of tobacco control with chronic disease prevention, and
- pride in their organization and tobacco control and chronic disease prevention efforts.

It should be noted that each of the individuals contacted in the TCAN/PHRED PHA and the investigator knew each other professionally, in one case for more than 20 years. The initial contacts also included some discussion of personal issues and developments (e.g.

the investigator's father had just died, one individual was addressing a personal health matter, and there was shared concern for another colleague who was seriously ill at the time). Interviews were scheduled quickly. However, in several cases, due to full schedules on the part of the interviewee and the interviewer, these took a few weeks to be convened.

4. Reflections on initial interviews after the first four interviews

Post interview notes for one of the first three interviews (May 8 and 11) indicate that the interviews "were so wide ranging and complex that it is difficult to determine major themes… Clearly, the focus on organizational development toward mission, goals etc. and project management were big. The department has many complexities and is undergoing organizational and program restructuring."

The interviewer also reflected on several questions that pertained to the actual interview structure and questions, with a view to assessing whether there were excessive demand characteristics. As already noted, these questions were – Does this/that question generate responses that are expected? Does it generate responses including non-verbal cues and what does this mean? To what extent do I think that the responses are biased on the basis of social desirability, or other demand characteristics? Could the questions be posed in another way that would reduce the demand characteristics?

Following the first interview, the following reflective notes were made: "(i) The first set of three questions really opened up the interview. I also spent time to make sure that the interviewee knew that I really wanted to know what his/her views were and the fact that there is no right or wrong answer. He/she was very much at ease throughout the interview. … (ii) There were no obvious non-verbal cues that suggested any problems with questions. However, to indicate expansiveness – e.g. population-wide as opposed to individual – the respondent would use hand gestures. Near the end of the interview, we had run over time and I then directed the last few questions. Perhaps longer time on the later questions would have been helpful to get more complete answers on the last few points. I am not sure that I posed a question about diffusion characteristics either and will

need to search the interview for content. I thought that I might get back to her about this, if needed later. He/she was quite open. (iii) I am not concerned about social desirability bias, as he/she was really guiding the interview and I was reflecting understanding by my responses, which he/she confirmed at several points during the interview. (iv) The questions were posed in a very open-ended way to the point where I was questioning (in my mind) whether we would cover all of the topics needed. But most topics were covered in the interview which was about 1:43 hours in length."

In addition, following an interview, one interviewee sent additional supplementary information that he/she referred to in the interview. In addition to conveying substantive information about tobacco control, it included the following statement about the interview: "It's always a pleasure to spend time with you and I enjoyed this morning's interview a great deal. I expect that you'll get great information from your interviewees because you immediately put people at ease!!"

Please note that this section was actually paraphrased in order to correct grammar in quickly jotted and typed notes. In addition, the respondent's actual name appeared in the record and this has been changed to interviewee or he/she to protect anonymity. For the same reason, while the interviews are presented in the table in the order they were conducted, the interviewees are referred to alphabetically, but this nominal approach does not necessarily correspond to the interview order. This same practice (paraphrasing, being non-specific about interviewees) was used throughout the remainder of this thesis.

Following the interviews, which essentially took place back-to-back with travel time in between to permit relocation, the following notes were made: "Interviews today with interviewee B and interviewee C. Both interviews went extremely well and easily. Some more direct interaction occurred, such as bouncing ideas off the interviewees when it seemed appropriate and this led to either rejection or agreement and expansion of ideas."

Following interview D, the following was noted: "Spoke today with interviewee D. This interview was late starting. It was to begin at about 11:00 but did not start until about

11:25 or so. The interview was delayed as the interviewee was running behind and on teleconference. … The meeting schedule board (outside of his/her office) was quite loaded with a variety of meetings – including the cancer prevention coalition, nutrition, pandemic flue, FIPIPA, TB, and many more meetings which were taking place that week on three different levels in the department. … Interview questions were fine. The first few questions really opened up the interview and interviewee D was clearly comfortable with the interview. … We spoke of ill colleagues and the status of their health and recent developments. … The interview went on past 1:15 or so, even though he/she had another meeting at the same time."

It should also be noted that both interviewee B and D provided additional information subsequent to the interview and directed the interviewer to additional information on the internet. All interviewees in the first PHA were open to be re-contacted if needed to provide additional information or perspectives.

The investigator also noted that the notion of working knowledge was not well explored in the first two interviews. The investigator therefore posed questions after interview 3 and 4 were apparently completed (and in several other subsequent interviews as well). Essentially, the notion of working knowledge was described briefly as organized knowledge already in the minds of knowledge workers, already processed, assembled, and accessible for use. Interviewees were asked to reflect on whether this was real and if so, how it operated. This yielded interesting responses that would have not been accessed otherwise.

As noted previously, following these contacts with interviewees, the investigator had conversations with his supervisor (R. Cameron) and a member of his committee who had conducted similar research in Ontario local public health settings (B. Riley). It was agreed that: as the interviewees were apparently free flowing, there were data gathered from multiple interviewees and supplementary sources for each case, interviewees were open to be re-contacted, and there was little concern about excessive demand characteristics – it was fine to proceed with additional interviews and complete the study.

5. Subsequent interviews. Subsequent interviews were similar in terms of openness and apparent willingness to share information and state views. In a limited number of instances, the interviewees actually took the opportunity and time to correct perceptions/views of the interviewer. For example, the following are paraphrased from post meeting notes:

- Interviewee E was completely open and accommodating. Clearly, a very articulate person with well considered opinions. Interestingly, while he/she is leading the PHA tobacco control program and … he/she feels a bit of an outsider – or at least less versed – in the tobacco control issues.

- Interviewee F was also very open. I had some concerns that he/she was actually trying to get approval for some responses as was evident by sometimes saying "right?" at the end of his/her responses. Throughout the interview, it was clear to me that he/she did not know of my prior role and responsibilities. He/she did seem to have a tendency to try to anticipate what it was that people wanted from interactions – and this in fact could be a reason why he/she was apparently good in his/her role in working with the local smoke-free coalition.

- Interviewee G was similarly very open and the interview was wide ranging.

- Interviewee H was very quiet, but clearly proud of what he/she and his/her colleagues had personally accomplished. He/she opened my eyes about the practical realities of enforcing progressive tobacco control legislation, giving examples that were not anticipated at the outset of the interview …

- During the interview, at times, I found myself being questioned and simply gave straightforward and factual answers, and even stated opinions. … It was apparent that they were grateful to have someone travel to them and to join them in their own offices. They were very good hosts. They actually went out of their way to introduce

me to other managers, the health promoter who was wife of the board member, and anyone else who came around. They acknowledged and interacted with whoever they met in the building, including the cleaning staff (consistent with the interview content). One senior director and I went to a restaurant operated by a Board of Health member. At that time, matters were discussed that will never be documented, including here in this study. Just before we returned after lunch to conduct another interview, some confidential hard to deal with issues were discussed off tape.

- Interviewee number J was very open and accommodating. Clearly, he/she did not know or at least show that he/she knew my role. … After the interview, I informed him/her of my background, role, etc. and clarified rationale for changes that were made to the provincial tobacco control statutes.

- Interviewee K was also very open to talk. … The interview was interrupted and the tape turned off on 2 occasions due to the interviewee having to confer with other senior colleagues about an issue that need to be attended to with some urgency.

The investigator was satisfied that the interview format was sufficiently open-ended that it did not constrain dialogue.

In one instance, notes taken post interview (i.e. with interviewee F) led the investigator to go back and listen closely to the interview transcripts and to closely scrutinize the transcript. While the apparent interaction style on some questions was to pose a question at the end of some sentences – i.e. finishing statements with the question "right?", it seems that the interviewee was very forthcoming and open with information and opinions. Furthermore, this interviewee did not know the interviewer, nor did he/she know the interviewer's prior roles vis-à-vis some of the experiences that he/she relayed (e.g. that the investigator was an advisor to a former health minister who made a grant to his/her coalition, had initiated the heart health promotion program some 20 years ago, and played a major role in the Ontario media network. The role of the investigator was not mentioned or alluded to during the interview). There is therefore no reason to believe

that that the stories conveyed in the interviews where affected by excessive demand characteristics generated by the interview or interviewer. Additional previously documented experience of the local smoke-free council's advocacy efforts, coordinated with PHA tobacco control activities with respect to a 100% smoke-free bylaw confirmed much of the information provided during the interview.

As reported earlier, the interviews actually closed by asking if there was anything that should have been covered, but not asked about. The audio records indicate that respondents were satisfied that they had covered all important matters. There was also appreciation of the interaction, as suggested by the following quote. "The process I think gave us the opportunity to say just about everything. I don't think that I felt any barriers. You know, and again, I am impressed that you came here from Toronto to meet with us, and in the very fact that you came in with a base understanding about what we are doing here in this unit. That was great …. And … the interview questions are very open-ended and they leave lots of room for developing our answers. I enjoyed this. …"

D. Analysis

1. Phase 1 analysis – initial coding. The investigator was the only analyst for this project and in this section is most often referred to as the analyst. A summary of the overall method and decision trail associated with the data gathering and analysis is included in the discussion section (Table 10).

Phase 1 analysis involved the initial coding of the interview transcript text. It proceeded by first reading the textual documents generated through the transcriptions and, at the same time, noting potential categories that could be used to classify the data (i.e. microanalysis to generate initial categories per (Strauss & Corbin, 1998).

Not all transcripts were reviewed to select the initial categories however. The initial selection was based on four of them, two interviews of tobacco control coordinators/managers (interviews A and D), one interview with a manager of enforcement (interview B), and the combined medical officer-executive director

interview (interview I). This group was chosen as it was seen to be sufficiently broad to include perspectives from all three PHAs and from a variety of positions in local tobacco control action systems.

At this stage, there was no review of the original propositions, sensitizing concepts, or the basic realist model. Nevertheless, it must be acknowledged that the interview data yielded from the interviews were in fact developed in a open-ended semi-structured format designed to gather information on most, if not all aspects, of the area of investigation (i.e. context, information/evidence, culture and structure, working knowledge, social construction of knowledge, and the integration of knowledge into public health practice). Therefore, the data are extensive and seemed initially broad enough to cover all aspects of the model.

Lofland and Lofland's (1995) suggestions for seeking to differentiate qualitative data into categories on the basis of on type, frequency, magnitudes, structures, processes, causes, consequences and agency (Lofland & Lofland, 1995) were considered before starting the generation of categories.

The initial list of "potential" categories that was generated on reading the transcripts included some 77 categories. These were added to the NVivo7 project as free nodes.

Subsequently, it was decided to review the research questions, the conceptual model of context-mechanism-outcome configurations, and sensitizing concepts. Furthermore, it was decided to include in an initially stated "best practices" category any explicit mention of scientific evidence pertaining to interventions (implied previously but now to be made explicitly inclusive of this concept), to include a modified concept of "working knowledge", include a social construction category, and to create a culture item that would include similar processes of conditioning, interacting and elaborating as articulated in the sensitizing concept (which was in turn based on Archer, 1995; Archer, 1996; Archer et al., 1998; Archer, 2000).

At this point, there were 80 nodes that could be coded and the analyst began to take seriously the need to reduce the number of categories, if only for pragmatic reasons. At 330 pages X 80 variables, there would be 26,400 pages if they were coded one category at a time and one page at a time. The analyst recalled Glaser and Strauss (1967) that "All categories are obviously not equally relevant, and so depth of inquiry into each one should not be the same. Core theoretical categories, those with the most explanatory power, should be saturated as completely as possible. Efforts to saturate less relevant categories should not be made at the cost of resources necessary for saturating the core categories." (p. 70)

Nonetheless, the analyst felt that it was too early in the analysis process to reduce the categories to a smaller set, as the study was to be grounded in the data. Furthermore, the analyst was determined to permit the final set of categories to emerge from the textual data afforded by the generous contributions of time of the 12 interviewees. Forcing of the data (Glaser, 1998; Glaser, 2004) was to be avoided to permit the categories to emergently fit the data.

It was also apparent that there may be several initial codes that were redundant or could be combined at latter stages. For example, the codes for job category and position were combined into one category called "positions and roles", which permitted a wider range of information to be coded under the category including the specific job title or category and role related information (e.g. manager of enforcement and enforcement officer were both coded, as was medical officer, tobacco control manager, executive director etc.). These were combined at the beginning yielding 79 free nodes potentially needing coding.

At the beginning of the initial coding process, the coding was extremely time consuming and painstaking. For example, starting at the top of the alphabetical list, complete coding for 4 nodes in 4 transcripts (i.e. taking one PHA interview as a set), took about 4.5 hours. After about 12 hours, the first 4 codes of 79 free nodes were completed – only about 5%. At this rate, it was apparent that coding may take as long as six weeks fulltime work, in order to simply do the initial coding. However, it was also noted that the analyst was

now becoming increasingly familiar with the texts, was recalling the conversations, and was able to anticipate the words and points in the interviews that various concepts would arise.

Therefore, a decision was made to proceed through the initial coding using a combination of (i) visual inspection for incidents (eye-ball scanning) and coding of complex categories; and (ii) textual queries (using the NVivo7's text search command), inspecting them and then entering them as appropriate to free nodes.

The first variety of search was used, for example, to code broad categories of concepts and related text such as "social construction of knowledge", "reflective practice", "adapting and contextualizing", and "capacities and competencies". The second variety of search was most commonly employed for those categories that were easily associated with specific words – such as "audit", or "TCAN" or "tobacco control area network", or "wisdom" (including wise), or "youth action alliance" or YAA. The second variety of search was also informed by the analyst's recall of the interviews, and by being reminded during the review of texts about the terminology used in specific interviews (e.g. one health unit was structured into quads or quadrants that could be used to identify references to structure; others referred to specific cultural groups as demonstrations of efforts to be culturally sensitive and relevant, e.g. Somali, Portuguese etc.).

This process continued until all initial coding was completed. See Table 4 for a listing of the names of initial codes (free nodes), a brief description of the category, the number of interviews coded for content associated with each code, and the number of paragraphs with referenced content. This list includes 69 categories (free nodes) of text.

(The close reader might note that coding was also completed for some codes not initially included on the list. This included the textual data about (i) "questions not asked" as posed to the interviewee near the end of the interview (e.g. Was there any question that I should have asked you that I didn't?); (ii) advice about additional supports that should be offered from other levels of tobacco control (national, provincial, regional) that might

assist with the practice of tobacco control locally; and (iii) comments on the interview process. As discussed later, advice about additional supports [i.e. (ii)] was subsequently summarized into a table. There was little new information added by the additional codes [i.e. about questions not asked and about the interview] that was not captured in the categorization scheme and therefore otherwise reflected in the analysis that follows.)

Through the process, several initially proposed codes were combined or dropped. This occurred in instances when it was judged that little would be lost by dropping them, when they could be combined with other categories (e.g. Ministry of Health and Long-term Care was dropped since all mentions of this ministry were associated with Mandatory Health Programs and Services Guidelines pursuant to the *Health Protection and Promotion Act* and were included in the Mandatory Programs node). Otherwise, they were dropped if the analyst (coder) became aware that there was little to code pertaining to the category (e.g. era of tobacco control was infrequently mentioned – i.e. the current Smoke-free Ontario era almost was frequently mentioned, and local bylaw and Ontario Tobacco Strategy eras were much less frequently discussed).

After about nine full days of coding (approaching 100 hours), the initial coding was near completion. On day 10 of the analysis, three additional analyses were completed of the initial codes (i.e. free nodes). A final reduction of the categories was made reducing the number of categories to 58. Then analyses were conducted using NVivo constructing matrices of the free nodes (initial codes as rows) against the "PHA set" of interviews. In the body of the matrix, the number of sources/interviews coded on the free node within the PHA was noted. The final set of initial codes was captured as 58 free nodes in NVivo7. This is presented in Appendix G.

This analysis serves as a sort of crude saturation adequacy analysis. It was inspected by the analyst, and where there were no or few sources/interviews coded on a particular node, the interviews were searched again for incidents in the data associated with that code/node. Minor adjustments were made to coding to the point that the analyst had

satisfied himself that there were not further incidents to be found for those with little or no coding associated with them (i.e. the initial coding had identified incidents even for the low frequency codes).

Table 4: Initial Codes – Listing of All Initial Free Node Names, Category Descriptions, Number of Interviews Coded, and Number of Paragraphs With the Coded References

Name	Description	Interviews	Paragraphs
Social construction of knowledge	Pertaining to clearly social processes of developing knowledge and understanding	11	507
Capacities and competencies	Abilities of the organization, system, or individuals working within it to carry-out an activity	11	453
Adapting and contextualizing	Taking information or programs etc. and tailoring them for application in a local circumstance	11	240
Other public health issues	Public health issues beyond tobacco control mentioned in interviews	9	161
Best practices, guidelines and systematic reviews	Advice, protocols, guidelines, and reviews of scientific evidence	11	125
Training and Technical Assistance	Continuing professional development programs, conferences, internal or external to the organization, consultative services and networks designed to build individual and organizational competency	11	90
Ministry of Health Promotion	Ontario Government ministry responsible for the Smoke-Free Ontario strategy, but does not include the Community Action Working Group and related subcommittee structures	10	89
Resource availability	Availability of financial, human or material resources, including educational resources and other program materials	10	89
Politics	Formal political governmental, inter/intra-organizational and interpersonal social and political maters	11	85
Organizational developments	Historical, evolving and/or planned changes and developments within the PHA	11	69
History	History	11	67
Leadership	Different perspectives/views and styles of leadership; Leadership development efforts	11	59
Population health orientation	Pertaining to population level planning and execution of public health interventions; as opposed to individual level	10	58
Evaluative research	Evaluation studies broadly defined, including formative, process, outcome evaluations; Overlaps with surveillance and monitoring, as well as health assessment at macro levels	10	56

Name	Description	Interviews	Paragraphs
Priority populations, targets, audiences	Groups that should be given priority or otherwise be the targeted beneficiaries of interventions, including health communications	9	55
Geographical context	Socio-economic and spatial/physical aspects of the PHA environment	11	54
TCAN and subcommittees	Tobacco Control Area Networks, their subcommittees, associated staff, and communications	8	46
Scientific literature	Literature published by scientists, often in peer reviewed journals, but also other/grey sources	8	46
Restaurants and bars	Public places that serve food and beverages	7	42
Voluntary sector organizations and other community partners	Voluntary health agencies, health charities and other partners in the community, excluding health care organizations (which are separately categorized)	7	41
Theories of action	Mental models, logic models, and theoretical frameworks guiding thinking, planning and action	10	41
Cutting edge issues	Issues at the cutting edge of tobacco control, beyond current statutory and regulatory reach	9	41
School settings	Schools, universities and community colleges	9	41
Performance, quality improvement and accountability	Monitoring systems that track performance and are concerned with quality improvement and accountability, but excluding audits and accreditation	9	40
Organizational culture	Aspects of the PHA internal environment that condition, interact, and elaborate public health practice	10	38
Imperatives and obligations	Legal mandatory requirements, contracts, and system/organizationally sanctioned and expected practice	10	38
Youth Action Alliances	Program to support youth development and advocacy and funded by the Ministry of Health Promotion	9	36
Externalization	Storytelling related to frontline public health practice	6	32
Communities of Practice and Networks	Defined by the interviewees, or "People who share a concern or a passion for something they do and learn how to do it better as they interact regularly" per Wenger, and broader networks with similar purposes	10	30
Job mobility and staff turnover	Job switching due to promotions, maternity leaves, openings, and other career progressions etc.	8	29
Organizational values	Things that are described to be important to the organization as a whole or to senior decision-makers in PHAs	7	29
Workplace	Setting for interventions, i.e. policies, programs, and services	8	29
Organizational planning	Planning for the organization as a whole, whether it pertains to tobacco control, chronic disease prevention, or overall organizational strategy	9	27

Name	Description	Interviews	Paragraphs
Home	Setting for interventions, i.e. policies, programs, and services	10	25
Working knowledge and knowledge conversion	Relating to the concept of working knowledge, knowledge development in the PHA	5	23
Federal involvement	Health Canada, PHA, Royal Canadian Mounted Police, Transport Canada or other federal organizations	9	23
Health Care Sector Organizations	Health care delivery and planning organizations, including hospitals, organized physician groups, Community Health Centres, Family Health Teams, Local Health Integration Networks, Cancer Centres and others	6	22
University Relationships	PHA relationship with a university or faculty of the university	8	21
Audits and accreditation	Audits and accreditation	6	20
Cultural sensitivity and competence	Demonstrated activity to be relevant, sensitive to and competence vis-à-vis ethnic, cultural, linguistic, sexual preference-based organizations and groups	8	20
Mandatory Health Programs and Services Guidelines	Programs requirements by local boards of health pursuant to the *Health Protection and Promotion Act*	6	18
Health assessment	Health status reports, needs assessments	8	18
Surveillance and monitoring	Tracking of distribution and change of risk and disease in populations	7	17
Equity	Concerns equal access and/or equal health outcomes	6	17
Reflective practice	PHA professional staff considering and deliberating on the process, structure, and outcome of their practices	9	17
Social determinants of health	Broad social, economic and political factors associated with health outcomes	3	16
Library or resource centre	Library services, whether in-house, external, staff or contracted	7	14
Tobacco Free Councils and Inter-agencies	Local and provincial coalitions that communicate, cooperate, coordinate, or collaborate to advance tobacco control	5	14
Vision related	Mission and vision statements and aspirations	4	14
Union or bargaining unit	Union, unionized or other collective organization for working people	7	12
Positions and roles	Jobs, titles and responsibilities in the PHA	11	12
Cycles	Regular routines, whether daily, weekly, monthly, quarterly, yearly, or an electoral cycle	8	11
Sustainability	Pertaining to sustained, durable effort in tobacco control locally	6	11
Integration	Integration however defined; generally related to the coordination of effort within the PHA and/or with external partners	5	11
Community responsive	Pertains to doing what is requested by the community, whether justified or not	4	8

Name	Description	Interviews	Paragraphs
CAWG and Subcommittee	Provincial community action working group and its subcommittees	3	7
Innovative grant	Grant made by the Minister of Health Promotion to advance smoking cessation or workplace initiatives	3	7
Client service oriented	Oriented toward the service of a person or persons	2	7
Advice about provincial support	Advice offered about what might be done at the provincial and regional level to support local tobacco control	3	6
Error tolerance	Disposition of the PHA senior management to tolerate error, and related risk taking	4	5
Job security	Sense of job security	3	3
Protocols and instructions	Specific protocols and instructions provided by the provincial government to local PHAs to implement	3	3
Interview process and questions	Comments made on the interview process itself	3	3
Cash flow	Cash flow from the provincial government to transfer payment agencies generally referring to late calls for proposals and/or delays in funding announcements	1	3
Burn out	PHA staff exhaustion	1	2
OTS Incidents	Mentions of the Ontario Tobacco Strategy	2	2
Questions not asked	Information about questions not asked that should have been	1	2
Under-staffing	Inadequate staffing complement, part of full time equivalents assigned	1	1
Wisdom	Wisdom	1	1

2. Phase 2 analysis – integrating and elaborating the categories. Phase 2 analysis involved the integration and further elaboration of the categories. At this point, the analyst sought to structure the categories into a tree, branch, sub-branch and twig framework that formed a clear and defensible set of categories. The category structure of this new tree structure would be comprised of data that are not mutually exclusive. To the contrary, as the categories are filled with coded textual data that is categorized into more than one free node, they are overlapping and related. Nevertheless, the categories represent higher order or fundamental concepts. These categories have certain properties – i.e. attributes, qualities, characteristics – that will be common to the whole class but will not necessarily distinguish it from others. These will also have various dimensions, which may measure or be discernable along some continuum (e.g. length, breadth).

These distinctions have been made by others (Charmaz, 2006; Dey, 1999; Glaser & Strauss, 1967; Strauss & Corbin, 1998).

To start phase 2, the analyst inspected the initial categories (i.e. 58 yielded by phase 1 analysis). Following this review, it was apparent that the broad categories from the basic realist model might provide a starting point for high level conceptual ordering of the categories. However, it would need some modification. Some of the categories in the original model were not readily apparent from the initial analysis (i.e. they were not part of the emergent theory at this point in the analysis) and there was the possibility that they may not emerge at all. Furthermore, a time category seemed appropriate given the dynamic nature of tobacco control and public health. Therefore, a general "time" category was added.

The analyst essentially created a high level conceptual ordering of the categories by including the broad categories of the basic realist model, but modified these to include the additional broad categories of "interpretation" and "time". The former relates to social construction in the basic realist model (depicted in Figure 1) but is broader. The latter is essential to describe a long-term public health intervention that has evolved over many years.

The initial conceptual ordering included the following:

- Information and evidence – pertaining to information and evidentiary inputs to decision-making,
- Interpretation – pertaining to social construction of knowledge processes,
- Organizational changes and development – pertaining to intra-organizational factors and relations with external partners of the PHA in the tobacco control action system,
- Organizational environment – pertaining to the external environment of the PHA, and
- Practice integration – pertaining to the development and implementation of plans, policies and programs in tobacco control.

Three additional categories of codes were possible and subsequently added. These were:

- Knowledge aspects – pertaining to definitional aspects of the prior model (knowing, knowledge, knowledge conversion, wisdom, and working knowledge),

- Time – pertaining to time, history and phase of development (e.g. prior provincial law, bylaw or Smoke-Free Ontario era), and
- Other – pertaining to the questions posed about advice about supports from other levels of the tobacco control system, and the actual interview process.

To complete the integration and further elaboration, the analyst used the tree node function of NVivo7 and integrated free nodes into tree nodes based on the above 8 categories.

Based on the initial grouping, it became apparent that with the integration of codes pertaining to "wisdom" and "working knowledge" into the "interpretation" category, the "knowledge aspects" category would be without substance. It was decided therefore to integrate the "wisdom" and "working knowledge" aspects into the "interpretation" category, so that the "knowledge aspects" broad category could subsequently be dropped.

Furthermore, it was also apparent that the actual "decision-making" aspect was missing, yet essential to be able to move from consideration of various factors in public health contexts to actual action. Therefore, the analyst added this aspect as a subcategory under the interpretation category and relabeled this broad category "interpretation and decision-making". It also necessitated the analyst returning to the text to identify dimensions of this aspect for inclusion in Table 5.

Time was a neglected and needed category and as a result it was added as a category.

The "other" category contained the free codes labeled as follows: (i) advice about provincial support; (ii) interview process and questions; (iii) questions not asked (this included responses about whether there were any additional questions that should have been asked in the interview but were not); (iv) cutting edge issues; (v) other public health issues; and, (vi) Ontario Tobacco Strategy incidents. This last set was included for comprehensiveness in the review as decisions had not been made at this stage as to the disposition of the categories (e.g. to fold in, keep separate, or discard).

However, it was now further decided to leave the other category items (i), (ii), and (iii) from the conceptual and theory building analyses for the time being. They would be integrated later, if appropriate and as needed (i.e. should there be additional substantive content found in them after analyzing the data fully). However, there was no additional value added from these separate codes and they were subsequently dropped. Item (i) is reported separately at the end of this section (see Table 9).

Item (iv), "cutting edge issues", was moved into the "practice integration" category. Item (v), "other public health issues" was relabeled "potentially competing public health issues", and was moved under the "organizational aspects" category. Item (vi), "Ontario Tobacco Strategy incidents", was integrated within the "time" category.

This left the following categories for the conceptual ordering: Information and Evidence Aspects; Interpretation (and Decision-Making); Organizational Aspects; Organizational Environment; Practice Integration; and, Time. Free nodes were further subcategorized within each of these higher order categories

As Strauss and Corbin (1998) note this sort of ordering is a "precursor to theorizing. A well-developed theory is one in which the concepts are defined according to their specific properties and dimensions" (p. 20). They also note that for many investigators this is the desirable research end point.

Table 5 – presents a breakdown of categories into subcategories – the conceptual ordering of the categories for evidence-informed practice of tobacco control in Ontario PHAs. Each branch, sub-branch and twig for this tree structure is identified in the table. In addition, to explain further the various properties within the categorization scheme, the dimensions as identified from the transcription texts and field notes are further explicated in the table.

Table 5 – Conceptual Ordering of Categories for Evidence-Informed Practice of Tobacco Control In Ontario PHUs

Branch A: Information and evidence

Sub-Branches	Twigs	Dimensions identified from transcripts and field notes
Empirical evidence	Evaluative research	• Needs assessment • Program/intervention planning and evaluation (evaluation support, relates to technical assistance) • Evaluation studies • Indicators and alignment with surveillance • Grounded experience/learning – action-oriented research (feeding reflective practice) • Qualitative research in public health practice – a health promotion process • Long-term perspective on impact/outcome evaluation
	Externalizations	• Stories based on experience • Examples of anticipated experience • Local examples
	Health assessments	• Needs assessments • Health status reports, regular reporting • Use of survey data • "Table Top Interviews" • Risk assessment • Socio-demographic profiles and assessing distribution of risk and determinants of health • Health indicators • Information to the board/community
	Scientific literature	• Best practices through systematic reviews • Scientific contacts • Library and librarian services • Review of international peer reviewed literature in specific focused areas • Importance of grey literature • Literature on organizational development • Importance of research supported/evidence-based approach (scientific reflection) • Blending with other information • Relevance and current issues • Variety of audiences – staff, public, decision-makers • Importance of source of information distribution • Volume of information related issues • Acceptance of basic facts regarding tobacco • Acceptance of broad social determinants of health and tobacco use

Sub-Branches	Twigs	Dimensions identified from transcripts and field notes
	Surveillance and monitoring	• Rapid Risk Factor Surveillance Survey • Epidemiology • Compliance observance and monitoring • Benchmarking • Mandatory Programs and Services related indicators • Need for more, constrained by resources
Technical assistance and training	Best practices, guidelines and systematic reviews	• Evidence from other jurisdictions on policy • Need for digested evidence, efficient use of staff time • Evidence-based guidelines for cessation, for different disciplinary groups • Informs intervention logic model development • Skills enhancement program available from Public Health Agency of Canada pertaining to surveillance • Field-based experience with government protocols • Professionals sharing information internally, and internal working groups/networks on best practice • Role for libraries (university, PHA, community) • Discussion in management and division sessions • Personal professional responsibility to stay abreast of current evidence • Should factor into annual work planning, lack of formal mechanisms • Need to generalize lessons to public health practice with client groups (e.g. children in schools, adults etc.) • Need for context-based interpretation of best practices including what is politically feasible • Practical experience provides guidance (e.g. time of year for smoke-free laws to come into effect)
	Protocols and instructions	• Ministry of Health Promotion protocols are used as guidelines that are interpreted by local enforcement and legal staff • Potential new protocol under the *Health Protection and Promotion Act* • Centrally developed protocols may not be applicable locally or implemented inconsistently • Should be developed with field input and reality testing and document guidance
	Professional development	• Professional development is a key value for each PHA • Some professional development involves movement/job changes with the PHA • Trying to balance organizational needs and individual interests • Professional development (continuous learning and development) associated with workplace quality of life • Strongly supported by senior PHA management • Some linked to quality assurance mandates • Strong models of practice-based professional and inter-professional networks and leadership exist in local health agencies
	Conduct of training and technical assistance	• Learning from tobacco control shared with chronic disease prevention and other strategies • Marrying business literature to public health practice • Ontario health promotion resource system including web-based resources, internal resources and professional colleagues • Role of the Tobacco Control Area Networks • Local staff believe that they are generally well supported, with some notable exceptions • Provided by consultants to public health, by managers to staff, by staff to external partners and clients, to decision-makers (including politicians), and across networks

Sub-Branches	Twigs	Dimensions identified from transcripts and field notes
		• Learning from peers as opposed to hierarchical authority (per "father knows best") • Primary mechanism of social change in organizations, communities, and systems • Role of universities to train practicing professionals and work with PHAs to develop and share knowledge • Role models can demonstrate model behaviour, share experience and provide inspiration (may be elite, managers, peers) • Needs to be specific to roles and interests of PHA staff (e.g. YAAs, enforcement, cessation etc.) • Lack of capacity at the Ministry of Health Promotion in key areas (e.g. Smoke-Free Ontario Act) • Need for key resources, tools, educational resource materials (e.g. how to) • Some questions about the balance of investment in training versus execution
Networks	Communities of practice and networks	• Good opportunities provided by provincial conferences to network, share experience • Enforcement network is supportive (although leadership lacking from the provincial level in some instances) • Network includes current and retired police officers • Media network materials widely shared • TCAN networks provide good forum for regional communities of practice • Interprovincial practice networks exist • Collegial networks supportive of tough assignments (e.g. enforcing new laws) • Linked organizationally to professional development forums for skill building • Strong relationships develop during advocacy campaigns, then dispersed following successes
	Reflective practice	• Involves learning from personal and colleagues (peer to peer) experiences • Sometimes group differences needs an arbitrator or judge (or manager or director) • A part of cultural sensitivity and concern for equality and access • Broad based consultation and strategic planning exercises have engaged frontline staff • Reflection on personalities and interpersonal relations • Managers reflect on their own values, practices, and challenges • Evaluation seen to be part of reflective practice • Part of team/staff meetings • Minutes can document main messages/lessons for posterity and those who missed meetings
Background	Audits and accreditation	• PHAs actively engaged in planning, accreditation and quality improvement • Audits of program records are used as a quality assurance tool in some programs (enforcement, cessation) and are seen as a model for others • Public reporting in public forums is also a form of accountability (links to politics and accountability) • Auditing increases public accountability and senior management volunteer for and are open to audits • Comprehensive program auditing functions not well developed, although it might be argued that accreditation serves a similar function at a higher level
	Imperatives and obligations	• Contracts, job performance, organizational expectations of performance • 100% funded smoke-free Ontario programs have specified scopes of service and have reporting requirements related to deliverables • Concern about short term nature of some 100% funding • Boards of health must approve all programs of the local PHA • Medical officers have roles as CEOs under the HPPA

Sub-Branches	Twigs	Dimensions identified from transcripts and field notes
		• Union-management contracts spell out requirements for hiring and promotion • Local politics demands that local politicians be informed (not blindsided) by any controversial developments • Enforcement staff have an obligation to apply laws and regulations consistently • Organizational values create expectations (e.g. equity, evidence-based etc.)
	Mandatory Health Programs and Services	• Mandatory Programs and Services goals affect strategic plans • Mandatory guideline is an oxymoron • Requirement to comply with the Mandatory Programs and Service Guidelines • Decision latitude exists even within the mandatory programs
	Resource availability	• Community-based work requires assessing and accessing community assets (e.g. non-governmental organizations, government departments [including health, social services, planning etc.], business and personal voluntary contributions such as time and effort) • Resources are linked at the local level in ways unknown or unimagined provincially (e.g. substance abuse web sites) • Knowledgeable people in other health units are seen as an asset • Need to coordinate efforts among different type of staff so as complement (e.g. enforcement and school activities should complement not conflict) • Materials from the provincial level are shared (e.g. media network) • Mandatory programs compliance (or lack thereof) can be used to mobilize resources • Budget planning (e.g. cash management) provides opportunities sometimes (e.g. gapping) • Human resources are most important (and costly) asset • Others include resources for media communications (e.g. video, mass communications), financial (e.g. for training from Heart Health), central supports (e.g. policy, planning, evaluation), external allies (e.g. advocacy coalitions), and special individuals/professionals (e.g. Josie d'Avernas) • Resource stewardship is a senior management responsibility • Tobacco control is seen to be relatively well resourced compared to other public health issues

Branch B: Interpretation and Decision-making

Sub-Branches	Twigs	Dimensions identified from transcripts and field notes
Adapting and contextualizing	Local and regional circumstances	• Pubic health agencies are based in local communities, nested within regional networks • Good working relationships and sharing of information among neighbouring PHAs • These relationships are also dependent on issues beyond tobacco control (e.g. dirty dining, infection control) • Staff are generally hired from within the community, or within the region • Structure of local businesses, school boards, hospitals etc. varies among health units • Circumstances are unique, but may bear similarity to other similar PHUs • Expectations of consistency on legislation and enforcement across jurisdictions • Relationships within the community, including between the community and the PHA, are based on history (personal, family, community, advocacy group, ethno-cultural group, gay/lesbian, university, political etc.) • Diffusion of innovation related issues (e.g. neighbouring units, other developments in the province) • Determines assets available to be mobilized for tobacco control or which can be easily accessed (relates to geography)
	Adaptation to circumstances	• Local creativity is expressed many ways, including interpretations of laws, compliance seeking approaches, and programs • Local health agencies develop their own procedures • Relates to client, population characteristics, social determinants of health • Relates also to organizational culture as well as structures created to plan, develop and implement strategies • Adaptation of programs and experiences from other jurisdictions to new contexts (e.g. shelters, smoke-free regulations from BC) • Provincial law enables local tobacco control bylaws to be more progressive
	Sense-making	• Interpretation of provincial opportunities, directions etc. (e.g. warnings, YAA events) • Rationalization of programs and resource opportunities for local level (e.g. TCAN, YAA) • Local studies seen as most relevant • Tendency to integration with total program (e.g. chronic disease prevention, determinants of health, within tobacco control – prevention, cessation and protection as well as other roles in provincial tobacco control) • Balancing interpretation of literature with local norms, values and beliefs
Social construction of knowledge (and subsequent social construction of reality through actions)	Organizational roles and responsibilities, as well as organizational reporting lines	• Division of responsibilities for cessation and prevention, from enforcement, divides knowledge, decision-making, and action • Single point of accountability on tobacco control needed and preferred • Information sharing, decision-making and knowledge development within lines of

		work • Must work toward integration across lines and programs to share knowledge • Some evolving roles and responsibilities and organizational developments increases uncertainty, although progress being made (shared management responsibilities) • Need to make sense of the organization, rationalize elements across lines • Need to coordinate professional development across lines • Roles and responsibilities charting, PERT/CPM and other project management techniques • Committees and meetings used to coordinate across programs, as well as within lines • Permanent or temporary staffing, staff mobility affects what is factored into knowledge • Can be role conflicts over priorities (e.g. food inspection versus enforcement of tobacco laws) • Long distance to communicate from local level, through TCAN, through CAWG, and Ministry
	Personal and organizational commitments, ownership and identity	• Top level leadership and support for coherent, integrated approach • Personal passion, commitment to and identity with the issue is clearly a factor (e.g. "my thing, my platform") • Wanting to be a leading PHA, centre of excellence, model for others • Organizational vision, mission, and strategy statements get cited and used regularly among staff • Some have developed careers dealing with this issue and have their personal identities tied to their work and place • Professionals expected to be knowledgeable and up to date, linked to professional networks and information sources
	Engagement of internal and external partners and clients	• Application of planning process – strategic, management, operational • Creating opportunities for success and trying to build successes and recognition • Creating overarching shared vision • Some partners funded by the Ministry are engaged at the TCAN level • Some looking to link Smoke-Free Ontario strategy initiatives with cost shared initiatives under the Health Protection and Promotion Act, particularly chronic disease prevention and child health • Wanting to be culturally sensitive, relevant, and competent in serving communities; High concern about equity and access • Groups that come together on their own with PHA support are supported developmentally
	Social salience of information	• Scientific information/evidence is critical in policy debates and decision-making, and less so following the decision, although still useful for implementation related communications • Chronic disease prevention or tobacco control plans (including logic models and indicators) seen to provide framework for coherence/sense-making and subsequent

		coordination of resources and action • Direction and factual information from the Ministry of Health Promotion is seriously considered and relied upon (mandatory program, protocols, communications about the law and regulations etc.) • Communication of important messages from senior management • Different perspectives on importance of being "community responsive" or "population-based"/planned • SARS was as shock, diminishing the importance of other information/health issues • Case information is critical for enforcement, information system developments at provincial level delayed but local PHAs are hopeful and see value of information technology •
	Social aspects of information sharing, interpretation and learning	• Information/evidence and experience provide a basis for social interaction within teams and amongst senior levels (a substrate for social exchange) • Information is used for accountability and making the case for resources and therefore program growth • Learning through reflection on practice, errors and successes • Learning occurs across issues (e.g. CDP, dirty dining) • Expectations that hot issues will be brought to senior management's attention • Technology facilitates exchange of information • Physical location is important for social relationships and knowledge development • Problems with field implementation fed back to the Province provides some pressure for change • Learning is acknowledged to occur at all levels; sometimes it is systematically gathered from the frontline, other times not • Success can be a point of pride and professional acknowledgement
	Action/practice imperative	• Initial priority given to develop new initiatives starts these initiatives in a manner somewhat disconnected from other tobacco control activities (e.g. YAA, enforcement) • New initiatives are unstable, more difficult to evaluate and initially learn from • Some indication that greater priority is placed on action than planning per se
Theories of action	Mental models and frames of reference	• Social determinants of health orientation affects orientation and need for integration into broader plans/models of organization (including within substance abuse paradigm) • Clients/public also have theory own understandings (e.g. interpretation of laws) • Public health has an evidence-orientation • Participatory orientation also apparent • Tobacco control example can be frame of reference for other program reorganizations (e.g. regional to program) • Development of innovative models (e.g. practice leaders networks, community engagement framework) and adaptations (e.g. local youth initiatives)

	Logic models	• PHAs develop their own models/frameworks and indicators • Need to ongoing review and updating in light of changes and new priorities
	Micro and macro levels	• Smoke-free Ontario strategy requires local intervention rationalization in light of overall logic models for the strategy produced by the Ontario Tobacco Research Unit • Program theories of action (e.g. resilience, risk taking, refusal skills etc.) • Diffusion of innovation as a possible local macro-practice theory of change • Espoused theory and actual theory of macro/micro engagement not the same
Wisdom	Frontline public health	• Experience and wisdom of frontline staff about "what works" • Deep roots in communities yields a different kind of evidence about needs and what works • Need for more systematic ways to engage frontline staff
	Local political feasibility	• Senior management must factor the art of the possible and practical into decision-making, including what is politically feasible
Working knowledge and knowledge conversion	Personal interests and frames of reference	• Personal interests determine, in part, which literature is attended to and incorporated into local processes (e.g. personal interest in organizational development, culture, innovation in business processes etc.) • Related to frames of reference, mental models etc. (e.g. logic models, social determinants of health framework)
	Practical utility	• Useful in interacting with others, need to communicate (and at least be briefed on content) • Enables nurturing of current practice or creating something new • How information and knowledge fits with organizational mandate
	Complementarities	• Understanding that others will pick up on different knowledge • Relying on others (trusting others) to have in depth and readily accessible knowledge/information • Relates to size of the organization and the ability to access other professional staff knowledgeable about complex, cutting edge matters (more difficult in smaller PHAs)
	Personal accountabilities	• Professionals in certain roles are responsible for content knowledge • Politically charged, high profile, and controversial issues may demand personal attention to a matter due to ultimate accountabilities (e.g. medical officer accountable to board on politically charged matters) • Medical officers have mandated chief executive and professional content obligations
	Mindshare	• Having to balance what is attended to, as there are only so many hours in a day and so much that can be absorbed
	Social processing	• Reliance on others (see complementarities, and social construction) • Assessing the adequacy of their knowledge for one's specific purpose (or whether one is not confident and therefore must seek additional sources) • Anticipation of need and the ultimate purposes for the information and knowledge including persuasive communication (e.g. a questions that may come up at a Council meeting due to perspective of a member) • Interpreting others interpretations for a particular use

	Level of abstraction	• Some public health professionals are conceptual, others more concrete and practice-oriented
	Technological extensions	• Making information available immediately, in the field (e.g. hand-held wireless devices used in public health inspection and enforcement)
Decision-making	Policy	• Decisions internal to the organization that determine a particular direction • May be reflected in organizational mandates, public documents, understanding about the priority to be placed on tobacco control
	Assignment of responsibility	• Assignment of lead responsibility for overall coordination and communication of that decision • Assignment of roles and responsibilities among various players, internal/external • Personal commitments to achieve a particular result
	Resource allocation	• Allocation of human resources, financial resources • Voluntary commitments
	Program planning	• Collective decision-making • Engaging partners and resources necessary to execute the plan • Sticking to decisions and commitments

Branch C: Organizational Aspects

Sub-Branches	Twigs	Dimensions identified in the transcripts and field notes
Capacities and competencies	Human resources	• Size of complement (numbers), assignment to different roles, temporary/permanent, experience (e.g. years of service, involvement in tobacco control) • Tobacco control enforcement and public health inspection are separate, yet coordinate work together, complementary skills (e.g. inspection, laying charges) • Disciplines – nursing, inspection, health promotion/planning, prosecution, library science, information technology (e.g. web), evaluation etc. • Across programs – chronic disease, family and child health, reproductive health etc. • Understaffing – inadequate staff, or part of staff when a full position may be needed • Staff working knowledge – i.e. stay current in the literature • Staff mobility – new staff need training, experienced staff leaving take knowledge, staff get new exposures within the organization or through secondments, leave to take up jobs in other PHAs or within the system • Union and other bargaining units and their agreements with management – professional development, hiring and promotion • People make a difference – personal commitments, passions, skills • Ministry of Health Promotion has funding and suggested staffing allocations based on scopes of services, population, and geography – may lead to more or less staff that seen to be needed locally • Some very real and well considered concerns about lack of a public health human resources plan, schools of public health to train core competencies, burn-out of staff, and succession planning
	System specific	• Ability to carry-out various functions (e.g. planning, policy, program development, evaluation, surveillance etc.) • Accreditation by Ontario Council of Community Health Accreditation • PHA may play a role as a provincial or regional resource
	Intervention specific	• For specific interventions need certain skill sets • Youth coordinator for Youth Action Alliances • Designated enforcement officers and expectation of knowledge and consistency of application of provincial compliance and enforcement protocols • Trained cessation counselors • Health communications – media relations and marketing expertise • Community mobilization/organization/development
	Cultural sensitivity and competence	• Need understanding of cultural communities (broadly defined) • Development of relationships
	Relationships	• With outside organizations, including health charities, health care organizations, police organizations (e.g. local, provincial, RCMP, inter-provincial networks), media, universities, businesses

		• Familiarity and accessibility, working relationships with outside groups and organizations • Complex organizational matrices (akin to home room with individualized assignments and professional trajectories • Degree of involvement and influence one has on a program (or perceives one has) • Ability to evoke excitement, commitment and exercise "leadership" • Interdisciplinary aspects – working together, mixing disciplines, project orientations, teams • Librarians/resources centres and colleagues understand professional interests and share specific information/references etc. • Breadth of issues – stretching to address built environment (e.g. may affect drifting smoke in multiunit dwellings • Camaraderie and willingness to help in tough situations (e.g. new law enforcement) • Affected by geography – physical proximities, transportation availability and travel times • Relations also to local tailoring and contextualization
	Surge capacity	• Being ready and able to pull together in a crisis (e.g. pandemic, SARS)
	Multiple levels of the system	• Centralized supports for areas of PHA programs – e.g. quality assurance, planning, epidemiology, evaluation, accreditation • Frontline, team, area, PHA wide, PHU wide, region wide, provincial, federal • Multiple points of accountability
Culture	Values	• Valuing evidence, science, logic models, rational planning • Valuing community interaction • Valuing population health orientation, with some questions about the value of being entirely community responsive • Valuing a client/population-group centered orientation • Valuing equity and equal access • Valuing human resources and creating a culture that is a "good place to work" • Valuing innovation and learning • Valuing excellence and leadership, respect for past excellence • Valuing performance management and accountability as a mechanism to ensure quality and justify needs for programs • Some concerns about political leadership not always valuing public health professional views and credibility • Want to work with the Ministry of Health Promotion, to share experience and programs with colleagues, and interact as part of a vibrant public health system (extends to shared accountability for some interviewees) • Public/tax payers deserve standard uniform services
	Vision and mission related	• Vision, mission and strategic directions are on agenda and discussed by management and staff regularly • Relates to values
	Hierarchy / heterarchy	• Decision latitude, autonomy, democracy, involvement/participation • Delegation of responsibilities and breakdown of work • Relates also to the overall size of the organization, larger being more hierarchic

		• Some interpersonal politics are inevitable, although not widely discussed (e.g. relationship between enforcement contractor and police, personal friendships, respect, sometimes tensions about what is more important – tobacco enforcement, food safety inspection etc.)
	Tolerance of error	• Non-tolerance for not bringing forward mistakes, particularly if they are not already contained • High expectations that mistakes not be repeated and that learning will inform future actions • Recognition that some programs have longer cycles and errors may not be readily apparent (whereas debriefing and dissecting experience is common place in acute response situations such as outbreak management) • High expectations that management know and comply with procedures (e.g. human resources)
	Tolerance of discord	• Support for independent coalitions, councils and advocacy organizations • Recognition of need for democratic process, benefits and costs • Understanding pragmatic compromise, with authoritative evidence-based public health input • Media provides mechanism for accountability, full airing of issues, and opportunity for informed professional opinion to be considered
Organizational developments	Major organizational developments	• PHAs are complex, multi-line, professionally-based organizations with complex histories • Amalgamation and regionalization requires time to build relationships, build common culture • Rebuilding public health services and complying with mandatory programs is a clear agenda, supported by local councils (including growth of budgets and staff) • Organizational changes are long-term endeavors taking years and decades to shift organizational cultures • Priorities vary by PHA, however efforts to address broad social determinants of health and equity and access appear in all agencies' history and plans. Tobacco control is consistent with this view of public health role • Tobacco control contributes to organizational changes within PHAs more generally (culture, working relationship, perhaps a more mature issue etc.) • Strategic planning is a mechanism/tool for shifting organizations toward visions/mission and rebuilding culture • Senior level staff support tobacco control developments as a coherent effort within PHAs, with support from across PHAs. They nurture changes that they wish to support and hire competent people to lead them (with their support and intervention as needed) • Tobacco control enforcement has evolved through different era
	Sustainability	• Innovative cessation programs were not sustainable due to termination of agreements • Some concern about the sustainability of 100% programs although not wide spread; may be resulting in some health units using contract or short term positions • Program priorities will shift over time to new issues (e.g. when compliance is high with legislation in one area, shift to another; cessation priority groups may change; greater emphasis may be places on quality assurance after programs stabilize) • Understanding and hope that eventually the demand for tobacco control will be substantially less in the future (assuming smoking rates continue to decline) and resources may be

		otherwise applied in public health • Still large communities, settings, and priority groups can benefit, and the need will be there for the foreseeable future • Cutting edge issues (e.g. patio smoking, multiunit dwellings, smuggling, and ingenious industry continuing to market to children) suggest perhaps evolving roles for the future, not an end of tobacco control • For some individuals, personal career paths are a concern as they feel under paid in public health
Potentially competing public health issues	Range of issues	• A wide range of issues is on the top of mind of senior public health directors including: social determinants of health, access and equity, immigration and diversity, healthy babies and children, environment including community right to know and occupational and environmental carcinogens, cancer prevention, injury prevention including motor vehicle traffic accidents, urban/rural health, recreational water quality, economic health, chronic disease prevention, recreation, physical activity, housing, poverty, obesity, hunger, transportation, alcohol and other substance abuse including liquor in corner stores, food safety, mental health, build environments and urban planning (livable communities), infectious disease control, wind turbines, pandemic planning, SARS, post partum depression, early detection and screening of cancer, young women and weight, food policy, trans fat, certification of community health nurses and community health nurse standards, heart health, HPV vaccination, blood cholesterol, sun safety, immunization, emergency preparedness, clean air, site specific cancers, lead in drinking water, gay and lesbian health, plumbing approvals, AIDS, healthy food in vending machines, Freedom of Information and the Protection of Individual Privacy, TB, etc.
Structure	Organizational planning structures	• Organizational strategic planning, priority setting, represent organizational learning mechanisms in public health • Public health is a municipal corporate resource for health related changes – e.g. built environment • Program related strategic plans – e.g. determinants of health, chronic disease prevention, tobacco control • Trend toward consolidation of tobacco control into coherent strategies • Linking of SFO to other mandatory programs
	Structures for learning in the organization	• See information/evidence aspects, as many may be internal to the organization: i.e. access to scientific literature, training and technical assistance for staff, surveillance and monitoring, evaluation, reflective practice etc. • Separate budgets for professional training and development (courses, graduate programs)

Branch D: Organizational Environment

Sub-Branches	Twigs	Dimensions identified in the transcripts and field notes
Critical relationships	Community Action Working Group (CAWG) and Subcommittees	• Takes time to report issues through TCAN subcommittees to CAWG. Issues blended with concerns of other PHAs and can lead to loss of concern or focus on a local problem • Less engagement with the Ministry and colleagues through the CAWG and subcommittees than is desirable, although some committees are more active than others
	Ministry of Health Promotion	• Local public health staff rely in large part on TCAN coordinators to deal with the Ministry • Good and regular communication with media/issues management staff at the Ministry • Direction on SFOA and Regulations was late and anticipated to be so in the future • PHA staff appreciate centrally organized conferences/trainings for information exchange and sharing experiences • Local concerns about quality of some guidance given (e.g. smoking in vehicles), how communication occurs (e.g. inadequate communication with field about casino associated smoking shelters), and undermining authority of local public health enforcement staff (e.g. giving more latitude to comply with provisions in the SFOA and Regulation) • Material from the Ministry is very prescriptive • YAA scopes of services is a good model which balances direction with decision latitude • Ministry lack of experience with smoke control legislation shows • Communications to senior levels of the ministry are sometimes not returned, may require insider to facilitate relationships. However, there is willingness to work more closely with the Ministry provided that the Ministry is prepared to plan a facilitating/exchange role with other PHAs vis-à-vis resources, approaches etc. (apparent great social distance between senior Ministry of Health Promotion staff and senior managers in public health) • Mandatory Health Programs and Services for chronic disease prevention, and child health are responsibility of Ministry of Health Promotion; other programs also emanate from this ministry (e.g. heart health) but there are disconnects • Local PHA is prepared to do linguistic/cultural translations that others in the strategy, including the Ministry of Health Promotion may use •
	Tobacco Control Area Networks (TCAN) and Subcommittees	• TCAN Subcommittee mechanisms for exchange -- regular and important interactions for sharing of experience (horizontal), key local public heath agency staff participate • TCAN coordinators are employed by local PHAs, are experience in local tobacco control and understand local issues • Good rapport and working relationships with TCAN coordinators • Local PHAs see the value of the structure • Forum for coordination of regional training • Regional partners, including Health Canada, local public health and local health agencies come to the table
Financial transfers	Provincial and local funds	• 100% provincial transfers under the Smoke-Free Ontario strategy • 75% contribution under Mandatory Public Health Programs and Services from Ministry of Health and Long-term Care • 25% contribution under Mandatory Public Health Programs and Services from municipal governments • Option for municipalities to allocate 100% funding to local priorities
	Cash flow	• Transfer payment mechanism provides opportunity for strategic one time grants if it arrives on time (e.g. promotion

		associated with local bylaws) • Late starts and premature termination of innovation grants hurts local program and relationships – need for time to plan and use tax payers' dollars effectively
	Federal and US involvement	• Health Canada or Public Health Agency of Canada funding has been accessed locally for innovations and evaluations – as well as mass media public education programming • On non-tobacco issues (e.g. water quality, infectious disease control) local PHAs get national and international recognition
	Innovative grants	• Targeted to high risk, high needs communities • Terminated too early to develop and share experiences • Timeframe inadequate
Geography	Physical geography	• Rural/urban distinctions, density of population (see cases, Appendix H) • Travel times and distances vary substantially • Proximity to the regional TCAN and PHAs in the region affects relationships • Proximity to health sciences centres (relates to relationships) • Recreational opportunities (e.g. centres, lakes, rivers, bars, bush parties), proximity to urban centres (or USA) • Tobacco growing region, tobacco manufacturing region or not, proximity to tobacco growers (and illegal bails of tobacco)
	Local government structure	• Lower and higher tiers (regional) • Tax base and ability to finance public health • Public transportation • First Nations' presence
	Local organizations, cultures etc.	• Local businesses (e.g. mines, hotels, motels, etc.) • Cultural organizations, businesses (e.g. ethnic business owners, farmers markets, stockyards)and faith-based centres (e.g. churches, synagogues, mosques) • Cultural heritage (e.g. Oktoberfest) • Local media markets and areas of direct (media) influence
	Population	• Size, distribution (rural/urban – city/town/township) and composition
	Centres	• Corporate offices may exist in a local PHU or owners have businesses in multiple units
Partners and coalitions	Health care sector organizations	• Existence and relationships with Local Health Integration Networks, hospitals, doctors, community health centres, family health teams, addictions agencies, cancer centres, etc.
	Tobacco-free councils	• Exist or not, active or not • Advocacy oriented and focused on policy change versus interest in coordination of programs • Relationship to local heart health coalitions or not • May exist across PHU boundaries • Variable composition (e.g. health care organizations, cancer, heart, and lung-based voluntary health agencies, citizens, university professors)
	University relationships	• Standing relationships • Personal relationships • Project specific relationships • Teaching health unit orientations • Graduate programs for staff

	Voluntary sector organizations and other community partners	• Various relationships with Canadian Cancer Society, Heart and Stroke Foundation of Ontario, Ontario Lung Association, Ontario Campaign for Action on Tobacco, Ontario Public Health Association, cancer prevention coalitions, Ontario Tobacco-Free Network, Health Canada/Public Health Agency of Canada, heart health coalitions, others
Politics	Local government	• Need to keep politicians informed of potentially contentious issues • Program, policy and enforcement activity needs to be tailored to local sensitivities • Terms of office are longer and tenure in local politics may be lengthy • Community dynamics, local advocacy coalitions, and media advocacy play roles • Local history with bylaws and precedence in other jurisdictions • Courage of convictions and personal integrity of politicians • Sometimes abusive relationship from politicians to PHA staff
	Local-Provincial relationships	• Local and regional public health are looking to the province for consistency of application of roles and interpretation of SFOA and Regulation • Need for timely communications regarding implementation of enforcement, coordination of campaigns • Some would rather speak privately with the province than be publicly critical
	Local interpersonal/professionally supportive relationships	• Support from prosecutors and local justice of peace • Relationships between tobacco control enforcement and public health inspection is supportive • Relationships between police and tobacco enforcement generally very supportive • Intra-organizational politics (see culture, capacity and other aspects) • Role models and memories of past campaigns (e.g. prudent, scientifically grounded, and principled public servant) • Relationships between public servants and advocates, with clear division of responsibilities

Branch E: Practice Integration

Sub-Branches	Twigs	Dimensions identified in the transcripts and field notes
Cycles	Seasonal variations	• More migration toward water and recreational areas during the summer months • Greater need for enforcement of smoke control legislation and regulations on patios during late spring, early summer and fall • Cessation efforts often occur during National Non-Smoking Week in January of each year • Usually some activity during World No Tobacco Day at the end of May of each year, but topics are variable
	Funding cycles	• Call for proposals seem to close to deadline for submission, and there are delays in funding commitments • Budgetary cycles are annual, although dates tend to change • Regular budgetary submissions and annual reporting on Smoke-Free Ontario strategy deliverables
	Routines	• Daily (regarding checking in with the office, voice mail etc.), and weekly work routines (meeting with teams etc.)
	Other cycles	• Electoral cycles associated with being able to advance policy early in the cycle • Annual communication planning is being coordinated with the Ministry of Health Promotion and other partners within goal areas, not across whole program
Interventions	Intervention approach	• Standard array of interventions are used locally and coordinated with the Province – media and communication, policy, programs and services
	Intervention setting	• Standard array of intervention settings – home, workplace (including work vehicles), school (elementary, secondary), restaurants and bars, public places, long-term care etc.
	Priority populations, targets and audiences	• Youth actions alliances and youth • Range of diverse groups including restaurant and business owners, proprietors of public places, motels, hotels, bed and breakfasts, summer populations, families living in poverty, farmers, smokers, vulnerable or high need, entire population, Somali, Punjabi, Tamil, German, Korean, and South East Asian other ethno-cultural communities, youth, children, adults, gay/lesbian groups
Other aspects of interventions	Cutting edge issues	• Local PHA staff are very aware of issues that are cutting edge, not addressed satisfactorily by provincial policy, and represent issues to be addressed in the future through policy and program interventions. The following were mentioned: smoking in mines (indoor or outdoor?), definition of patios, smoking shelters at casinos, contraband tobacco, drifting smoke in multi-unit dwellings, promotion of tobacco products where tobacco is not sold, nationally regulated trucking vehicles, smoking on school property, hospitals, sale and giving tobacco (social sources) to minors, identification fraud, smoking in vehicles and at home, smoking out of doors (e.g. beach)
	Equity	• Some health agencies look to give control to frontline staff, others are hearing the voices of staff in planning • All PHAs have a general commitment to equal access and most are taking concrete steps to pursue interventions targeted to the most needy and increase sensitivity among their professionals
	Integration	• With other programs: chronic disease prevention, child health, reproductive health, broad determinants of health • Within tobacco control – coordinated effort across program lines (e.g. protection and cessation)

Branch F: Time

Sub-Branches	Twigs	Dimensions identified in the transcripts and field notes
Era	Early-bylaws and programs	• Pre-1994, including first Mandatory Programs and Services Guidelines that addressed tobacco control from approximately 1989 onwards
	Ontario Tobacco Strategy and Tobacco Control Act	• 1995 to 2004
	Enabled bylaws	• 1995 onwards including the current period
	Smoke-free Ontario strategy	• 2005 onwards
History	Local historical developments	• Local historical development relate to the above mentioned era, and recent history, particularly 1994 onwards affected local experiences with tobacco control bylaws • Greater resources in 1999 offered a system to support local activity and demonstrate some models now cited • Local bylaws may go beyond the provincial minimal standard • Local history of enforcement (e.g. prosecution in other jurisdictions, same jurisdiction) needs consideration to ensure consistency and proper communications • Short term "failures" actually advanced the issue • Local experience was shared among municipalities re: how to pass bylaws and implement them • Major gains took substantial time and persistence to develop (e.g. 100% smoke-free bylaws) • Professionals have long personal histories in leading tobacco control, recognized as champions of tobacco control • Local developments paved the way for provincial intervention
	History of tobacco control	• Long credible, science-based history • Broad-based public support is now apparent (e.g. polls, acceptance of new restrictions) • Mature movement, many niches filled, creates difficulty for new comers (and returners) to the movement

According to the originators of grounded theory (Glaser & Strauss, 1967), "the elements of theory that are generated by comparative analysis are, first, conceptual categories and their conceptual properties; and, second, hypotheses or generalized relations among the categories and their properties" (p. 35).

The section about phase 3 analysis (i.e. preliminary theory) integrates elements of this conceptual scheme (i.e. branches, sub-branches and twigs) into an initial integrated theory that has been delimited for parsimony and includes aspects of the conceptual scheme that are sufficiently well documented to be considered theoretically sufficient (i.e. saturated enough) for inclusion in a grounded theory. (The notions of theoretical saturation and theoretical sufficiency are discussed in the discussion section.)

Table 5 – Conceptual Ordering of Categories for Evidence-Informed Practice of Tobacco Control in Ontario PHUs includes six (6) major branches, twenty-five (25) sub-branches, and ninety-three (93) twigs. A description of each branch follows. Those not interested in the details of conceptual ordering may safely skip to page 110, where the preliminary theory and sub-components of the model are described.

a. Information and evidence. The "Information and Evidence" branch was further subdivided into four (4) sub-branches: "Empirical evidence", "Technical assistance and training", "Networks", and "Background".

The "Empirical evidence" sub-branch includes five (5) twigs: "Evaluative research", "Externalizations", "Health assessments", "Scientific literature", and "Surveillance and monitoring". "Evaluative research" was categorized broadly and includes needs assessments, program planning and evaluation (relates to technical assistance support as well), evaluation studies, development of indicators and their alignment with surveillance activities of the PHA, grounded studies and action-research (related to reflection on practice), qualitative research and having a long-term perspective to determine impacts. All of these sources of evidence are apparently considered and factored into decisions in local tobacco control.

"Externalizations" was the term used to categorize stories, actual local examples, and anticipated experience. These are seen as valuable cases in point of best practices or sources of information about experience and what to do or not to do.

"Health assessments" is a broad category including needs assessment (which may be specific to tobacco control), health status reports, surveys that seek to assess population level risk (e.g. Rapid Risk Factor Surveillance Survey), risk assessment (predictive modeling studies), socio-demographic profiles and their distribution in a PHU (e.g. use of census data), health indicators (e.g. mortality rates, smoking rates), and information that is reported to the board of health on such matters.

"Scientific literature" is a sub-branch of the "Information and evidence" branch that includes actual best practices reviews, systematic reviews of scientific evidence, contacts with scientists that convey information pertaining to scientific literature, library services, grey literature, and a wide range of literature from epidemiology, intervention, and organizational science. It was also reported that science was a source of information for a wide range of audiences and would be sought for a variety of subjects. Issues related to technical assistance includes the volume of information, and the notions that there was wide acceptance of "basic facts" about tobacco, social determinants of health, and tobacco use as related to socio-demographic factors.

"Surveillance and monitoring" overlaps substantially with the evaluative research sub-branch, and with epidemiology and risk factor surveillance. Observation of compliance with legislation and mandatory programs, monitoring of performance, benchmarking are identified as aspects in this sub-branch.

The "Technical assistance and training" sub-branch includes four (4) twigs: "Best practices, guidelines and systematic reviews", "Protocols and instructions", "Professional development", and "Conduct of technical assistance and training".

"Best practices, guidelines and systematic reviews" includes conveyance of evidence from other jurisdictions, as well as policy and programmatic experience. These are considered valuable when they present digested information and may take the form of guidelines for practice by various professional groups and can be used to inform the development of shared plans and logic models. There is a sense that there are a wide variety of providers for such information, including libraries, universities, management, and professionals within a PHA. There is also a sense that generalization of best practices from other contexts to professionals' environments is a critical matter. Practical advice about what has worked in other contexts is valued. Additionally, this is something that interviewees think should factor into the management process of tobacco control and be considered at least annually as part of the operational work planning exercise.

"Protocols and instructions" are developed for some aspects of public health interventions, sometimes centrally with the Ministry of Health Promotion or Ministry of Health and Long-term Care. When developed by the government, there is still a need for interpretation in the field and local understanding and application is an inevitable part of the process of their use. The field therefore thinks that these are best developed with their input. Even when this occurs, it is expected that there will be differences in application.

"Professional development" is an apparent key value for each PHA interviewed for this study. Professional development however takes many forms, including providing or pursing professional opportunities through job mobility/changes within the agency, continuing professional practice on or off site, as well as practice-based and professional and inter-professional networks for leadership development. There is an apparent interest to balance individual and organizational professional development needs in allocating resources to it.

"Conduct of technical assistance and training" represents a broad category associated with its various modes of practice. This includes transfer of lessons from tobacco control to other areas of public health practices (e.g. chronic disease prevention), marrying

business literature to public health practice, accessing technical assistance and contributing to Tobacco Control Area Network and Ontario Health Promotion Resource System related programs. There is a strong preference for learning from peers (as opposed to learning from a top down "father knows best" approach).

It is also clear that training and technical assistance is a primary mechanism for the transfer of ideas and social change in organizations, communities, and systems. For example, it takes the form of technical advice from professional technical assistance providers to public health professionals, from directors and managers to staff, from staff of boards of health to their boards, and from advocates to policy makers. Role models can demonstrate exemplary behavior. Technical assistance and training also needs to be tailored to actual practice areas to be relevant and useful (e.g. youth action alliance, compliance and enforcement). Resource materials (e.g. tools, educational resource materials) are valued.

The "Networks" sub-branch has two (2) twigs: "Communities of practice and networks", and "Reflective practice".

"Communities of practice and networks" include provincial and Tobacco Control Area Network conferences and meetings. These networks are seen to be very supportive in certain areas (e.g. enforcement, media network) and even essential for implementation (e.g. tough enforcement challenges are better handled after experience is shared). Coalitions/campaigns and networks have been very supportive of local activities. Some inter-provincial networks are also highly valued sources of practical experience sharing (e.g. community health nursing, inter-provincial medical officers). Communities of practice, professional practice networks, and other support structures (e.g. media network) are not differentiated. All are accessed and seen as important.

"Reflective practice" involves learning from personal and colleagues' (peer to peer) experiences. Sometimes judgments about what is "true" or "best" needs an outside arbitrator (e.g. manager) but often understandings emerge within a professional peer

network. There is recognition that planning processes provide opportunities for input and reflection by staff and managers. Managers clearly reflect on their own values, practices, and the challenges that they face. There is also an example in one health unit of the entire staff reflecting on their own personalities and interaction styles. Reflection and discussion is a regular part of many staff meetings and minutes and other meeting records are used to document reflections and decisions for those not in attendance (missing in action or on vacation) and for posterity.

The "Background" sub-branch is comprised of four (4) twigs: "Audits and accreditation", "Imperatives and obligations", "Mandatory Programs and Services", and "Resource availability".

"Audits and accreditation" is a category reflecting the fact that PHAs are actively involved in a planning, accreditation, and quality improvement-related activities at an organizational level. In addition, there are audits of program records in some departments for some programs for quality assurance purposes (e.g. enforcement, cessation). Public reporting is seen as a form of accountability (linked to political and media accountability).

"Imperatives and obligations" take the form of contracts (including union contracts), job specifications and organizational expectations for performance. Smoke-free Ontario strategy initiatives are funded at 100% and have scopes of service and reporting requirements associated with them. There is some concern that the 100% commitment might be a short run program, and this affects whether contract or permanent staff are hired. Boards of health must approve programming and medical officers are obliged to play a chief executive role as well. Locally, there are also expectations that major developments are reported to politicians in a timely manner (i.e. there should be no major surprises). Enforcement staff also feel an obligation to ensure that the law is consistently applied, within their jurisdiction, region and across the province. Organizational values also create a background climate of expectation about how provincial staff is to practice (e.g. concerns about equity and access, being evidence-based etc.).

"Mandatory Health Programs and Services" Guidelines, while seen to be an oxymoron by some, nevertheless document provincial expectations for compliance with the Guidelines. It is recognized that there is substantial decision latitude within the mandatory program requirements. Furthermore, a draft of a technical document prepared for the Ministry of Health and Long-term Care that outlines planned program requirements suggests that there may be further latitude in the future.

"Resource availability" pertains to a wide range of resources potentially available to assist with the implementation of comprehensive tobacco control locally. Community-based tobacco control requires the engagement and coordinated deployment of multiple assets in a community – including government, health charity, business and personal voluntary resources. Communities have resources that may be linked in ways that are unknown or unimagined at the provincial level. Knowledgeable people, regional-provincial-national networks, budgets, human resources, educational resource materials (including media), and other material assets (e.g. computers, internet websites) are all examples of resources that are important background for interpretation and decisions about what might be done locally. Tobacco control is seen to be well resourced when compared to other health promotion and disease prevention issues.

b. Interpretation and decision-making. The "Interpretation and Decision-Making" branch is further subdivided into six (6) sub-branches: "Adapting and contextualizing", "Social construction of knowledge", "Theories of action", "Wisdom", "Working knowledge and knowledge conversion", and "Decision-making".

The "Adapting and contextualizing" sub-branch is comprised of (3) twigs: "Local and regional circumstances", "Adaptation to circumstances", and "Sense-making".

"Local and regional circumstances" create the backdrop against which local tobacco control is practiced. PHAs are locally based, and nested within a regional network. The Tobacco Control Area Networks are regional networks that provide fertile grounds for

developing good working relationships and sharing information amongst local PHAs. Some of these relationships existed before the regional infrastructure was created (e.g. "dirty dining" and infection control necessitated regional relationships). Staffs are generally hired from within the community, sometimes from neighboring jurisdictions. Most believe that their local circumstances are unique but bear similarity to others in their area. Local communities have their own unique relationships among individuals and organizations and have their own history and cultural makeup. Diffusion of innovations occurs amongst PHAs. As indicated above, each community has its own assets and resources to contribute and the degree to which these may be mobilized for tobacco control varies among communities. Geography is also a factor that needs consideration in decision-making.

"Adaptation to circumstances" pertains to local creativity in conceptualizing, developing and implementing programs and policies (including the enforcement of local bylaws and provincial legislation). Local health departments develop their own procedures that specify how they will implement provincially mandated programs and protocols. In the development of these approaches, PHAs need to consider local clients, population characteristics, and social determinants of health. Adaptation of programs and experiences from other jurisdictions in local contexts occurs (e.g. learning from British Columbia Workers' Compensation Board regulation pertaining to designated smoking areas). The *Smoke-Free Ontario Act*, and the *Tobacco Control Act* before it, specifically enabled municipalities to implement more progressive tobacco control bylaws, the stronger of the provincial and local laws being the one that would apply locally.

"Sense-making" relates to adaptation. It has to do with the interpretation of provincial opportunities and directions, and the rationalization of programs and resources locally. It relates to the tendency of local PHAs to want to integrate efforts into an overall or total/coherent program of action on health issues (e.g. pertaining to chronic disease prevention or social determinants of health or within a comprehensive tobacco control strategy). It involves balancing an interpretation of the literature and expectations with local norms, values and beliefs.

The "Social construction of knowledge" sub-branch consists of six (6) twigs: "Organizational roles and responsibilities (including organizational reporting lines)", "Personal and organizational commitments, ownership and identify", "Engagement of internal and external partners and clients", "Social salience of information", "Social aspects of information sharing, interpretation and learning", and the "Action/practice imperative".

"Organizational roles and responsibilities" is an important determinant of social interaction in PHAs. Generally, the responsibilities for cessation and prevention are divided from enforcement/protection, although there is a desire to have the overall tobacco control program within PHAs well coordinated. A move toward a single senior point of accountability for tobacco control within the PHA seems to be preferred by local PHAs and the Province. Information sharing, decision-making and knowledge development generally occurs within the programs (cessation and prevention, versus enforcement/protection) and along organizational lines. However, there is an attempt to foster integration and sharing of knowledge and understandings across program lines within a coherent tobacco strategy. There is an interest to make sense of all tobacco control activities within the PHAs and to rationalize efforts across lines. Professional development may also be coordinated across lines. Roles and responsibilities charting, program evaluation and review technique/critical path method (PERT/CPM) and other project management tools are used to coordinate efforts among various players. Permanent and temporary staffing arrangements, staff mobility and secondments affect the stock of staff knowledge and experience available within programs. Furthermore, geography affects how often professionals interact, and the nature of reporting relationships, with both being less frequent in large geographic areas.

"Personal and organizational commitments, ownership and identity" also factor into interpretation and decision-making. Top level leadership and support for a coherent, integrated approach to public health practice was evident in all health agencies. Individuals and members of teams are clearly committed to tobacco control, or parts of it

(e.g. enforcement, working with youth, cessation), and take pride in their roles. They want to be part of a leading PHA, a centre of excellence and to serve as a model for their peers and colleagues. Organizational mission and vision statements permeate the organization and often arise in discussions about tobacco control and other priority setting and management committee discussions within the agency. Professionals have developed careers in tobacco control and have their own personal identities tied to their work and roles as PHA leaders in tobacco control. Professionals are also expected to remain linked into their own professional networks and information sources and to remain knowledgeable and up-to-date on issues within their scopes of practice. This also serves to make them known within their own professional practice circles (e.g. public health nursing, public health management, and tobacco enforcement).

"Engagement of internal and external partners and clients" is also an important defining characteristic in the social construction of knowledge in local PHAs. This may take the form of engagement in planning processes at strategic, management or operational levels. One manager indicated an interest in creating opportunities for success and permitting success and recognition to accumulate. Creating an overall shared vision for the PHA, of a program, or of an integrated strategy appears to be common in PHAs. Some non-governmental organization partners funded by the Ministry of Health Promotion are engaged at the TCAN level. Some effort is occurring to engage and integrate HPPA efforts in chronic disease prevention or child health with tobacco control and vice versa. Some organizations external to the PHA (e.g. voluntary health agencies) come together naturally, or have a common interest or mandate, and can work with the PHA effectively as a result. There is a clear interest to ensure that PHA programs are culturally sensitive, relevant, and competent in serving communities. There is concern about ensuring equity and access to interventions among diverse groups in PHU communities.

The "Social salience of information" varies over time and by context. Scientific information/evidence is critical in policy debates and decision-making, and less so following policy decisions. Nevertheless, it may also be useful in explaining policy at later stages (e.g. at implementation). Planning frameworks (e.g. chronic disease

prevention or tobacco control logic models) are seen as being useful to provide a sense of coherence and as a rationale for resource allocation decisions and actions.

Direction and factual information that emanates from the MHP is very seriously considered and relied upon. This may take the forms of mandatory program statements, protocols, communications about the *Smoke-Free Ontario Act* and Regulation. Staff also pay attention to messages from senior management (e.g. about the importance of evidence-based approaches, equity etc.).

There are different views about the value of a "community responsive" (i.e. doing what is immediate asked) versus a planned, population-based, and evidence-based intervention orientation. Apparently, in one PHA the outbreak of Severe Acute Respiratory Syndrome (SARS) was a shock to the system, making all other issues pale in comparison for a period of time. Case-related information (e.g. food service establishments) is critical for enforcement. Information systems development at the provincial level is promising, yet delayed.

"Social aspects of information sharing, interpretation and learning" is a multifaceted concept. Information, evidence, and experience provide the very basis for social interaction within teams of professionals. Clients can also have their own interpretations, and where faulty (e.g. interpretation of laws or regulations), they need to be adjusted through interactions with public health professionals. Information is the basis for accountability and also permits senior management to make the case for additional resources. Learning in group situations occurs through reflection and appraisals of successes and failures (e.g. in the form of debriefing) and learning from other issues is transferred into tobacco control practice (e.g. "dirty dining" and the need for consistency of application). There are social expectations that "hot issues" will be brought to management attention to assist with issues management and resolution. Technology, physical premises and locations of offices all affect social interaction and sharing and ability for joint interpretations. The multi-level nature of complex public health line authorities at the local level and through the regional TCAN structure system to the MHP

can diminish and distort messaging. It is acknowledged that success, failure, and learning occurs at all levels of organizations. While frontline experience and wisdom is valued, it is more difficult to incorporate into macro level decision-making (or at least less frequent). Certainly not last in this sub-branch, success can be a point of pride and offer opportunities for professionals to acknowledge their colleagues and staffs' contributions.

The "Action/practice" sub-branch pertains to the interest in senior management (in some instances) to give priority to action over planning. As the Smoke-Free Ontario strategy has youth prevention and the implementation of the smoke-free law as two key priorities, emphasis was placed on action in these areas. These have been left somewhat disconnected from other tobacco control efforts. New action-oriented initiatives are also less stable and often more difficult to evaluate.

The "Theories of action" sub-branch is comprised of three (3) twigs: "Mental models and frames of reference", "Logic models", and "Micro and macro levels".

"Mental models and frames of reference" refers to the orientation that public health staff and others bring to their practice. Social determinants of health and the need to integrate tobacco control within the larger plans of the department were a recurrent theme. An evidence-based orientation and/or participatory orientation are also orientations to public health practice. Tobacco control is also seen as a general model for application to other public health problems (e.g. regionalization of other prevention issues, general paradigm for chronic disease control). New and innovative models are also based on mental models and different frames of reference (i.e. practice leaders' network, community engagement frameworks) and adaptations of these (e.g. tailoring of the YAA to local circumstances).

"Logic models" could have been merged into the mental models category, but are kept separate as they represent a particular orientation to thinking about putative causes and effect sequences. PHAs develop their own logic models (and indicators) by adapting more generic models to their circumstances. They also need to be reviewed and updated

periodically in light of changing priorities and understandings about what steps or further interventions might be instrumental for further progress.

"Macro and micro levels" refers to different levels of logic models. Local logic models may be adapted from provincial logic models. At a minimum, in annual action planning and funding, local managers must rationalize local level efforts with macro logic models to justify that their efforts are "on strategy". Program theories of action (e.g. resilience, risk taking, refusal skills) are different than more macro level models (e.g. restrictions on availability through social policy controls, diffusion of innovation across different units of analysis).

The "Wisdom" sub-branch had only two (2) twigs that were identified in the interviews and field notes: "Frontline public health" and "Local political feasibility".

"Frontline public health" is a category that recognizes that the frontline staff have deep-rooted knowledge of the community and "what works" within the community. There was recognition that more systematic ways are needed to engage frontline staff in PHA planning.

"Local political feasibility" pertains to the notion that senior management must factor the art of the possible and practical into decision-making, including what might be politically feasible to sell and implement in their contexts.

The "Working knowledge and knowledge conversion" sub-branch has eight (8) categories/twigs as follows: "Personal interests and frames of reference", "Practical utility", "Complementarities", "Personal Accountabilities", "Mindshare", "Social processing", "Level of abstraction", and "Technological extensions".

"Personal interests and frames of reference" is the notion that individuals have prior history, knowledge, interests etc. that they bring to particular working contexts. In part, these personal interests shape choices about the literature that is read, understood, and

incorporated into knowledge. This includes personal interest and inclinations toward scientific information, as well as interests in organizational development, culture, innovation in business processes etc. This relates to frames of reference and mental models that professionals bring to the job context.

"Practical utility" has to do with many aspects of public health practice. While an individual may not need to attend to all information, it may be sufficient for him or her to know where the information/knowledge exists in the organization and access it as needed (e.g. requesting a briefing). Practical "know how" is also critical and access to it facilitates the development of new knowledge (e.g. from the frontline) or to sustain an existing practice (i.e. continuing to practice what is well known and familiar). If something is clearly associated with the mandate of the PHA (including legal mandates), then it is likely more likely to be seen as practical and useful to the organization.

"Complementarities" have to do it understanding that others will be attending to different information from different perspectives and it involves relying on others to possess certain knowledge. It also relates to the size of the PHA and the ability to access other professional staff that may be more knowledgeable about complex, cutting edge matters. It is more difficult for smaller PHAs, as they have less staff with highly differentiated areas of knowledge.

"Personal accountabilities" relate to professional roles, some of which may be mandated roles (e.g. Medical Officer of Health) or job responsibilities (e.g. tobacco control manager). On politically charged, high profile issues (or high profile issues that may potentially become contentious), there may be a requirement for close personal attention and knowledge development on the key issues. It is interesting to note that medical officers have both executive and medical accountabilities, whereas the CEO of hospitals and chiefs of staff divide and share these responsibilities in hospitals. This is a complicated role.

"Mindshare" is the notion that it is difficult to process all information conveyed in an intense period. Therefore, individuals selectively attend to some areas of information or knowledge and that such information/knowledge captures a certain proportion of one's attention. Individuals need to balance the amount of information that they attend to at any time during the course of a work day, work week etc. This leads to selective inattention to other matters.

"Social processing" refers to reliance on others, but still needing to assess critically the adequacy of staff knowledge for the specific purpose of a decision-maker. This determines whether one can be confident enough with someone else's knowledge, whether additional sources of knowledge must be sought out, and whether one must attend directly to the evidence in order to become knowledgeable for a particular purpose – e.g. answering questions from politicians or the media or making critical decisions. This depends on the anticipated need for information and the salience and importance of the reasons why such information will be put to use. This notion is essentially about interpreting others' interpretations for one's own use.

"Level of abstraction" is about the degree of concreteness or conceptual orientation of individuals. Interacting with some professionals is very much grounded in professional practice, whereas for others it is more conceptual and theoretical.

"Technological extensions" has to do with making information immediately accessible for immediate incorporation into practice knowledge and actions. For example, with the advent of wireless technology and cellular communication, information can (in theory) be accessible on the spot for tobacco control inspection and enforcement activities. This is currently done with cellular telephones. Hand held wireless data exchange devices were anticipated shortly (i.e. soon in the fiscal year), after the interviews were completed.

The "Decision-making" sub-branch reflects decision-making necessary to move actual knowledge into practice. It takes the form of at least four (4) twigs: "Policy",

"Assignment of responsibility", "Resource allocation" and "Program planning" related decisions.

"Policy" is about taking decisions that determine a particular direction for a program, strategy or entire organization. These may have to do with setting a bylaw, a strategic policy of the PHA that a particular issue or topic will be given priority, or a major program decision in terms of the course of action to pursue. It could involve decisions to terminate involvement in particular practices (e.g. dropping all cost shared mandatory tobacco control activity).

"Assignment of responsibility" has to do with first assigning a lead director and/or manager responsible for tobacco control, communication of this decision, and the subsequent assignment of specific roles by the designated lead for various aspects of the work necessary to execute a plan. In some instances, it actually means an individual taking personal responsibility to achieve a particular result (e.g. medical officer assuming personal responsibility for the creation of a tobacco unit).

"Resource allocation" has to do with the assignment of resources – human, economic, material, voluntary etc. – to a project. In some instances, these are exact (e.g. number of new enforcement staff FTEs assigned to *Smoke-Free Ontario Act* implementation) and in other instances the estimates are less precise.

"Program planning" decisions generally pertain to collective decision-making and commitment to a project, engagement of partners and resources necessary to execute the plan. It also may mean sticking to decisions to implement the plan in the face of opposition to these plans or when presented with options that are not on strategy. Such was observed with respect to politicians sticking to commitments vis-à-vis bylaws in spite of opposition.

c. Organizational aspects. The "Organizational aspects" branch is further divided into five (5) sub-branches. They are "Capacities and competencies", "Culture", "Organizational changes and development", "Potentially competing public health issues", and "Structure"

The "Capacities and competencies" sub-branch is further divided into seven (7) sub-branches: "Human resources", "System specific", "Intervention specific", "Cultural sensitivity and competence", "Relationships", "Surge capacity", and "Multiple levels of the system". Capacities are system, inter-organizational and organizational in nature. Competencies generally refer to individuals and groups in public health. Sometimes these terms are used interchangeably. Competency is seen to be a more value-laden term.

"Human resources" as a category refers to the size of the staff assigned, roles to which the human resources (people/staff) are assigned, and whether they are temporary, contract or permanent staff. There are multiple disciplines engaged in tobacco control – nursing, inspection, enforcement, health promotion/planning, prosecution, evaluation, epidemiology, library science etc. Staffs are assigned across a wide variety of programs, including health protection/healthy environment, chronic disease prevention, family and child health, reproductive health, and planning and evaluation, among others. Public health inspection that is related to other aspects of environmental health and enforcement of the tobacco laws at the provincial and local levels are coordinated, although in large part separately enforced.

Staff mobility and turnovers is a constant issue for public health managers. However, mobility also creates opportunities for staff development, learning, and retention (i.e. mobility among jobs within an organization may enhance retention). Union-management agreements determine professional development, hiring and promotion of staff. It is clear that individuals make a difference and personal commitments, passions, skills etc. contribute to organizational and program success. The MHP has funded positions for particular roles and suggested staffing allocations based on scopes of services, population size and geography. Senior managers have some concerns about the lack of a province-

wide health human resources plan, the need for training in core competencies, staff burn-out, and the need for succession planning.

"System specific" competencies and capacities refer to the ability to carry out core public health functions such as planning, policy development, program development, evaluation etc. The Ontario Council of Community Health Accreditation sets standards for core system related capacities in public health. It is also hoped that the provincial PHA, the Ontario Agency for Health Protection and Promotion, will exercise leadership in building system and organizational capacities, and individual competencies, in core areas of public health practice including tobacco control.

"Intervention specific" competencies pertain to those required for specific interventions such as the coordination of Youth Action Alliances and youth leadership development, designated enforcement officers for compliance monitoring and enforcement of the Smoke-Free Ontario Act, trained and certified counselors for smoking cessation (e.g. group therapies, more than minimal interventions), health communications and community engagement, mobilization, and development of new programs and policies.

"Cultural sensitivity and competence" relates to the interest of all PHAs to understand and be sensitive to the interests of cultural communities broadly defined (ethic, socio-demographic, income, sexual preference, age groups, etc.). There is an understanding that this is about more than language, and it is about the need to develop relationships and mutual respect with various communities.

"Relationships" are also an important aspect of capacity (or competency) in public health. These include relationships with outside organizations, including health charities, health care organizations, police organizations, media, universities, business and others. These are important for access to leadership, populations, resources, and for coordinated execution of strategies. Relationships within the organization are obviously important as well. Aspects of relationships in public health include sometimes being structured as a completely matrixed organization, influence and leadership of staff, ability to work

together in interdisciplinary teams, access to knowledge and information sources (e.g. personal, library), as well as camaraderie and willingness to help out in difficult situations. Relationships are also affected by geography: physical locations and travel times in particular. Staff working in the same office is more likely to develop close working relationships.

"Surge capacity" does not relate to tobacco control. However, this issue came up unprompted in all PHAs. All PHAs are prepared for emergencies – including epidemics of infectious diseases (e.g. pandemic influenza). It is apparent that all public health staff, including tobacco control staff, must be ready to assume additional roles in emergency or crisis situations and they are planning to and are prepared to assume these roles.

Last, it is widely acknowledged that PHAs and the public health system is a multi-level structure. The "Multiple levels of the system" aspect recognizes that in health units contacted there were local PHA centralized resources assisting with various areas of PHA capacity development. These include quality assurance, planning, epidemiology, evaluation, and accreditation related activities. There are frontline, teams, area, PHA, PHU, regional, provincial and federal aspects of public health system capacity. The complexity of the system leads to many points of accountability.

The "Culture" sub-branch is further divided into five (5) twigs: "Values", "Vision and mission related", "Hierarchy / heterarchy", "Tolerance of error", and "Tolerance of discord".

"Values" pertains to those aspects of the organization that interviewees thought were shared and important throughout the organization. A range of these were identified including: being evidence-based, interacting with the community, being population-based, equity and being accessible to those needing services, innovation and learning, human resources and being a good place to work, excellence and leadership, accountability and quality, and wanting to work with the Provincial government and other PHAs and partners to address leading public health issues.

Clearly related to this is the category "Vision and mission related" aspects, as they are essentially statements of vision for the organization, its mission, and strategic directions – all of which imply priorities. Apparently, in at least some PHAs, these are regularly introduced into discussions about programs and departmental priorities.

"Hierarchy / heterarchy" is about the degree of hierarchical structure of PHA. Large organizations necessarily have hierarchy. However, as a cultural element, there is an apparent interest in providing a degree of decision latitude and autonomy to professional staff, as well as having democratic involvement and participation in the life of PHAs (more in some than in others perhaps). In all PHAs, there is a breakdown of work, delegation of responsibilities, and accountability for work assigned. Some interpersonal politics is apparent in public health, although not widely discussed.

"Tolerance of error" is apparent. Admitting an error or bringing forward issues is reported to be a well respected practice in the PHAs visited. There are apparently high expectations that public health professionals also learn from mistakes and not repeat them. It is also recognized that for programs such as tobacco control, the impact of mistakes (or the program for that matter) may be difficult to discern and may take years to become apparent (e.g. changes in smoking rates at a population level taking years to develop, or not).

"Tolerance of discord" is a category related to external politics. It concerns: whether the agency supports independent coalitions, councils and advocacy organizations; recognition of the need for democratic processes for political commitments to issues to be made, as well as the costs and benefits of these processes; understanding that pragmatic compromise is often possible that respects and includes evidence-based public health input; and concerns a role of the media as a mechanism for accountability, fair airing of issues, and opportunity for the public health view to be heard.

The "Organizational changes and development" sub-branch is comprised of two (2) twigs: "Major organizational developments", and "Sustainability".

"Major organizational developments" pertains to the overall developments within the PHA that affect a wide variety of public health functions. All PHAs are complex, multifunctional, professionally-based organizations. They all have very complex histories and some have experienced regional integration or amalgamation in some form.

Regardless of the history, as a result of the major changes in PHAs, it is apparent that it takes considerable time (years) to build a culture and relationships in the organization. Rebuilding public health following a period of turmoil in the 1990's (i.e. due to municipal restructuring, downloading of responsibilities to municipalities, and downsizing of provincial government commitments) and early in the first decade of this millennium appears to be a priority for senior management and boards of health.

While priorities vary among health agencies, addressing the social determinants of health appears to be a priority for all; and, access and equity are concerns of all health agencies interviewed. Tobacco control – and a broader agenda of chronic disease prevention – is not seen as inconsistent with a priority on social determinants of health.

Tobacco control is seen to contribute both a model and a process for bringing various areas of the agency together to pursue collaborative planning. Strategic planning processes appear to be a key mechanism or tool for shifting public health organizations towards visions and missions and for rebuilding culture. Senior staff has played an active "hands on" role in building tobacco control as a priority within their agencies and have continued to support their assigned staff in leadership roles. Tobacco control enforcement has evolved over time, through different eras of legislation with associated challenges of compliance and enforcement. These periods are prior to the *Tobacco Control Act*, bylaw developments, and more recently the implementation of the *Smoke-Free Ontario Act.*

"Sustainability" as a category refers to the degree to which initiatives remain funded and continue. The MHP innovative grants program funding did not apparently engender long-term developments as grants were not long standing (i.e. two years or less) and did not permit proper pilot program development and evaluation. There is also some, but not widespread, concern that the 100% funding under the Smoke-Free Ontario strategy may not be sustained. However, most believe that the tobacco strategy has reached a different milestone. Program priorities have shifted over time. However, on the horizon, there appear to be many challenges and managers see the need for continuing tobacco control investments into the foreseeable future.

"Potentially competing public health issues" is a sub-branch with no twigs associated. Table 5 lists many, many other public health issues that were mentioned during the course of contact with the dozen interviews in public health. These issues were not prompted. However, it is clear that there are many substantial public health issues that require attention. All compete for scarce resources of PHAs and could affect the availability of these scarce resources for tobacco control.

"Structure" is the last sub-branch under "Organizational aspects". It is further sub-divided into two (2) twigs: "Organizational planning structures", and "Structures for Learning in the Organization". Organizational planning structures may be considered related to learning by the organization as a whole, permitting adjustment to the environment and setting out course corrections for the future. Structures for learning pertain more to individual level learning as opposed to organizational level learning.

"Organizational planning structures" affect tobacco control and will affect its future role and function within the PHA. PHAs, embedded in municipal structures, serve as an organizational learning resource for other municipal departments. They contribute to developments in other departments, such as planning for the built environment. Planning within the PHA related to the agency's approach to addressing social determinants of health, chronic disease prevention, or other issues will likely affect the future structure of tobacco control programs and interventions. There are also efforts being made to develop

consolidated and coordinated tobacco control structures and plans within each agency, including rationalization of interventions funded under the Smoke-Free Ontario strategy and those funded on a cost-shared basis under the *Health Protection and Promotion Act.* While these are potentially opposing moves (i.e. consolidation into a unified program and integration within a larger vision), they are seen as complementary in all health agencies involved in this study.

"Structures for learning in the organization" have already been mentioned vis-à-vis the informational and evidentiary inputs, as many of the sources of information are internal to the organization: i.e. access to scientific literature, training and technical assistance for staff, surveillance and monitoring, evaluation, reflective practice etc. All PHAs involved in this study actually had separate budgets for professional training and development (courses, graduate programs), as well as structures responsible to ensure that it occurs (e.g. central management committees, practice committees, assigned staff etc.).

d. Organizational environment. The "Organizational Environment" branch is further sub-divided into five (5) sub-branches as follows: "Critical relationships", "Financial transfers", "Geography", "Partners and coalitions", and "Politics". Each has a further sub-categorization into twigs.

"Critical relationships" are further defined and subdivided into three (3) subcategories/twigs that include "Community Action Working Group (CAWG) and subcommittees", "Ministry of Health Promotion", and "Tobacco Control Area Network (TCAN) and subcommittees".

"CAWG and subcommittees" refers to the central infrastructure created by the Ministry of Health Promotion. The interviewees reported that it takes considerable time to report issues through the TCAN subcommittees to CAWG. Furthermore, issues may be blended or watered down, they meld with other concerns from other TCAN PHAs and the local concern or problem may be lost. Furthermore, there is often little or no feedback through

this formal structure. There apparently is less engagement of and by the Ministry of Health Promotion through the central committee structure than is desirable to the field.

The "Ministry of Health Promotion" critical relationship subcategory is important to local PHA managers and staff. Local PHA staffs depend in large measure on TCAN coordinators to relate to Ministry staff. There is apparently good and regular communication between local staff and the communications staff of the Ministry.

Direction from the Ministry about the *Smoke-Free Ontario Act* and Regulation was reported to have been late coming to the field and it is anticipated that there will be delays in communication from the Ministry in the future. Furthermore, there are concerns locally about the quality of guidance given (e.g. smoking in vehicles), how communication actually occurs (e.g. directly to retailers in advance of notifying enforcement staff of policy changes), and apparent undermining of local efforts that would ensure consistent application of the law (e.g. affording retailers more time and latitude in implementing provisions in the *Act* or Regulation).

PHA staffs nevertheless appreciate centrally organized training events and conferences. It was noted that material related to legislative enforcement appears very prescriptive.

Youth action alliance scopes of service provided a useful balance of direction and decision latitude for staffs of PHAs to implement appropriately in their PHUs. There is an apparent willingness to share experience with the Ministry on a wide range of health promotion and enforcement activity in the field. However, communication with the Ministry at senior levels has been difficult, sometimes with communications not being returned to the field (e.g. unanswered letters).

There is also interest in better coordinating the various efforts that are supported by the provincial government – such as mandatory programs, heart health, family and child health. Local health agency staff is prepared to have their program materials taken up

and used more widely across Ontario (e.g. cultural-linguistic translations, substance abuse web sites, tobacco enforcement).

The "TCAN and subcommittee" critical relationship subcategory/twig is about the role of the TCAN and particularly the subcommittees. They are seen as excellent mechanisms for exchange where regular and important interactions occur, facilitating information exchange among local PHAs. There is a sense that TCAN coordinators, employed and working in local PHAs on behalf of the region, have solid field experience. They have good rapport and working relationships with local agencies and local PHA staff sees the value in the TCAN structure. TCANs have provided a useful forum for regionally based trainings and have provided a forum to bring multiple partners in tobacco control to the table (e.g. Health Canada, PHAs, non-governmental organizations).

"Financial Transfers" represents a second sub-branch of the "Organizational Environment" branch. It in turn is subdivided into four (4) aspects/twigs: "Provincial and local funds", "Cash flow", "Federal and US involvement", and "Innovative grants".

The "Provincial and local funds" subcategory/twig refers to the various arrangements for provincial financing of local PHA stewarded initiatives. As noted previously, the Ministry of Health Promotion funds Smoke-Free Ontario strategy initiatives with a 100% financial contribution and the Ministry of Health and Long-Term Care provides 75% of funding to cover the costs of Mandatory Health Programs and Services, in areas such as chronic disease prevention, child health, and reproductive health – some of which is directed at reducing tobacco use and second hand smoke exposure. There is also the option for local PHAs to fund additional initiatives with a 100% local municipal contribution, although this was not mentioned in any of the interviews.

"Cash flow" is the twig/sub-category that pertains to the timelines of cash flow from the provincial government to local boards of health. The government provided an opportunity for one time funding for innovative grants. These grants were intended initially to be used to develop innovative approaches to smoking cessation by working to

serve high need populations (e.g. underserved rural populations, mentally ill, lower socio-economic status etc.). Funds were to permit a developmental period and evaluation with a view to learning from the experience and being able to make the case for continuation and/or diffusion of innovations to other locations across Ontario. Reports from the field suggest that although the deadline for submission of proposals to the program was tight, the announcement of the awards, and the flow of cash was slow, and the program (in some instances) was prematurely terminated resulting in program discontinuity.

There are apparently some issues related to the municipal and provincial governments' having different fiscal year ends, which is annual cause for concern. However, the exact impacts on the tobacco strategy were not apparent or obvious.

The Youth Action Alliances were funded initially on the same basis. However, they were continued and expanded to all PHUs in Ontario. This program, unlike the cessation innovation grants program, is widely praised and is seen as a model for other grants programs and has potential for application on other issues (e.g. environmental health, obesity prevention etc.).

There was some concern expressed about the need for tax-payers dollars to be well spent and the cash flow problems with the innovation grants were seen as problematic. In addition to the challenge of managing a "soft funds" program like innovative grants, there have been regular annual delays in cash flow from the provincial level that have delayed implementation. The need for Ministerial announcements and credits (sometimes the Minister of Health Promotion was referred to as the Minister of Self Promotion) was seen, by some, to be part of the reason for delay.

"Innovative grants" were also identified separately as a twig. Apart from the cash flow problems articulated above and the short term nature of the program, it was not apparent to those in the field that the innovation grants were tied to a larger and longer term plan to develop cessation services in Ontario. There was some discussion about the original plan to develop "smoking cessation centres" that would exercise leadership in regional

cessation system development (i.e. leadership/planning centres not service centres). This was apparently poorly communicated from the provincial level, as local PHAs were not aware that this was part of a larger plan. As a result, there were complaints that the regional centres were simply receiving more resources than other PHAs and services needed to be available in communities, not in regional hubs too distant from smokers.

Health Canada also has a history of funding local initiatives in tobacco control – e.g. under the Federal Tobacco Demand Reduction Program of the mid-1990s, and more recently under the Federal Tobacco Control Program. These have been accessed by local PHAs. In a non-tobacco area, the US Environmental Protection Agency has funded a local Ontario initiative related to water quality demonstrating the possibility of international funding of innovation in Canada. These items comprise the "Federal and US involvement" subcategory or twig.

The "Geography" sub-branch is further divided into five (5) sub-categories/twigs. These were "Physical geography", "Local government structure", "Local organizations, culture etc.", "Population", and "Centres".

"Physical geography" pertains to the rural/urban distinctions and population density. It also relates to physical topography and location of the PHUs. It was noted that travel times for geographically large PHUs are substantial, with public health inspectors spending as much as a third of their time in travel and tobacco enforcement staff spending longer traveling among locations. Proximity to the regional TCAN hub also affects degree of physical participation in TCAN meetings, proximity to health sciences centres affects which universities PHAs relate to (i.e. more likely to relate to universities in local PHUs, sometimes to universities in regions, and less with others outside the regions). Proximity to recreational destinations (e.g. lakes, beaches) and proximity to the United States also affects seasonal populations to be served. Whether the PHA was located in a tobacco growing or manufacturing area was seen to be likely associated with influences on local bylaws, attitudes toward tobacco, and smoking.

"Local government structure" is about whether there are lower and higher tier (i.e. regional) municipal government structures to which the PHA must relate. The tax base of the municipality and local demand for services of local government also affect the ability to finance public health initiatives, even on a cost shared basis. Some municipal governments have well developed public transit systems, and others do not (one health unit did not have any public transit system). Also, the presence of a First Nation reserve community may affect the local availability of contraband tobacco products – as well as smoking rates among those who may search for cessation services off reserves.

"Local organizations, culture etc." are an aspect of local life. The nature and number of local businesses (e.g. mines, farms, hotels, restaurants), cultural organizations including business owners (e.g. ethnic business owners, farmers markets, stock yards, faith-based centres), local cultural heritage (e.g. German, Greek, Portuguese, Italian, Chinese etc.) celebrations and events, as well as ethno-linguistic community media outlets (e.g. papers, TV and Radio) represent clients for service, as well as venues/settings for service delivery, and channels for communication of tobacco control messages.

"Population" particularly, its size, character and distribution within a PHU is a factor (i.e. towns/cities versus country, socio-economic character, and mix of urban and rural). Clearly this is related to physical geography (e.g. topography, lakes etc.) as well. In addition, it was noted that some cities are in fact corporate head quarters or provincial "centres" for corporate offices. Some businesses operate in multiple PHUs and by reaching "head office" of large corporations located in one PHU, it may be possible to ensure consistent compliance across multiple corporately controlled locations in many PHUs.

The "Partners and coalitions" sub-branch is further divided into an additional four (4) subcategories or twigs as follows: "Health care organizations", "Tobacco-free councils", "University relationships", and "Voluntary sector organizations and other community partners".

"Health care organizations" are natural allies of local PHAs in their efforts in comprehensive tobacco control, particularly smoking cessation, but also in advocating for restrictions on smoking and the prevention of access to tobacco. The following were mentioned in interviews: Local Health Integration Networks (LHINs), hospitals, doctors, community health centres, family health teams, addictions agencies, and cancer centres.

"Tobacco-free councils" or local and provincial interagency councils on smoking or health have also been engaged and supported by local PHAs. In some areas they are more active than in others. When they were advocacy-oriented exclusively, the councils have tended to fade out of active participation following a period of active involvement. This was the case for some councils due to either passage of local laws and/or the *Smoke-Free Ontario Act*. However, there is an apparent effort to reconnect with local inter-agencies and their member organizations, including health charities and health care organizations, among others.

"University relationships" vary as might be expected. Some public health professionals have standing adjunct appointments and/or lecture at Ontario universities. Others have long standing working relationships with faculty, personal relationships, project related associations (e.g. evaluations of demonstrations), have been associated with the teaching health unit and later Public Health Research, Education, and Development program and/or send staff to the universities for graduate studies (e.g. Masters level training in public health).

"Voluntary sector organizations and other community partners" are essential to tobacco control as already discussed. Various relationships were mentioned including relations with the following organizations: Canadian Cancer Society (Ontario Division), Heart and Stroke Foundation of Ontario, Ontario Lung Association, Ontario Campaign for Action on Tobacco, Ontario Public Health Association, Ontario Tobacco-Free Network, Health Canada, Public Health Agency of Canada, cancer prevention coalitions and regional networks, and heart health coalitions.

The "Politics" sub-branch is comprised of three (3) subcategories/twigs as follows: "Local government", "Local-Provincial relationships", and "Local interpersonal/professionally supportive relationships".

"Local government" was also raised as a factor under geography and organizational structure. This sub-branch, i.e. "Politics", is concerned more about socio-political relationships than space or structure. There is a need to keep local politicians briefed particularly about emerging contentious issues. Program decisions, acceptable policy alternatives, and the actual process of implementation (e.g. enforcements) will be affected by local sensitivities and personalities. Terms of office are now longer and tenure in local political roles (e.g. councilor, mayor, reeve, trustee etc.) may be protracted. Local community dynamics, including the presence and activity of advocacy groups and media also factor in. The "courage of convictions" of politicians to follow through with promises should not be under estimated and has been clearly demonstrated in leadership to pass effective 100% smoke-free bylaws. The relationships between the political level and public service can be very respectful and functional, or it can be inconsiderate and abusive.

"Local-provincial relationships" are a second sub-category or twig. These pertain to the need for local enforcement activities to be consistent across the province (or at least amongst neighboring PHUs), and the need for communication to facilitate the coordinated implementation of campaigns and events (e.g. smoking cessation quit campaigns jointly implemented provincially and locally, media events and subsequent public education and enforcement on the implementation of new statutes or regulations). One respondent noted that a local politician would rather have a private word with a provincial politician than be publicly critical, as he/she wants to develop long-term working relationships on multiple fronts/issues. This affects the type of advocacy activity that local level staff, including medical officers, may be involved in.

"Local interpersonal/professionally supportive relationships" also seem critical to the successful execution of tobacco control. Strong support from the local justice of the

peace and prosecutors (i.e. Crown prosecutors) is critical if laws are to be taken seriously. The relationships between tobacco enforcement officers and other public health inspectors seem to be generally supportive, as are the relationships between police and tobacco enforcement officers. Inter- and intra-organizational politics (see also culture, capacity) are ever present. Role models and memories of past campaigns and shared experiences, serve to provide examples of positive working relationships and practice. In addition, relationships between public servants and advocates can be productive if each understands the others' role and what is permissible and/or negotiable or not (e.g. public servants are not advocates and must limit activities to information and support; advocates have not been prepared to compromise on specific aspects of a policy such as elimination of designated smoking rooms).

e. Practice integration. "Practice integration" is about the integration of knowledge and other considerations and inputs discussed to this point into the practice of tobacco control within the PHA and more generally with outside partners with in the PHU. The "Practice Integration" branch is further subdivided into three (3) sub-branches: "Cycles", "Interventions", and "Other aspects of interventions".

The "Cycles" sub-branch is in turn subdivided into four (4) sub-categories/twigs: "Seasonal variations", "Funding cycles", "Routines" and "Other cycles".

"Seasonal variations" such as greater summer migration toward waterfront recreational areas affect service populations (i.e. greater numbers in summer months). Enforcement of patio smoking restrictions requires more attention during late spring, early summer and the fall, than in the winter. Cessation campaigns often coincide with National Non-Smoking Week (third full week in January of each year) and there is usually some World No Tobacco Day activity plan for the end of May each year, although the topics vary.

"Funding cycles" include Ministry of Health Promotion issuing scopes of work and calls for proposals, deadlines for submission, review, and announcements of funding commitments. As mentioned earlier, the announcements may be delayed. In addition to

proposal calls and submissions, there is an annual cycle of reporting for program funded under the Smoke-Free Ontario strategy. The mandatory program guidelines are currently under revision and it is anticipated that there will be annual reporting requirements reinstated for them as well.

"Routines" relate to daily and weekly work cycles and routines, including requirements to check regularly with the office and attendance at team and other PHA meetings. "Other cycles" include longer term electoral cycles associated with the advancement of new policy initiatives, including major programs, and annual communication planning coordinated with the Ministry of Health Promotion's communication branch.

The "Interventions" sub-branch is further explicated by the inclusion of three (3) sub-categories/twigs: "Intervention approach", "Intervention Setting", and "Priority populations, targets and audiences". It should also be noted that interventions are generally directed toward one or more goals: prevention of smoking among youth, motivation and support for cessation, and elimination of environmental tobacco smoke, including second hand smoke. Sometimes social denormalization of tobacco and/or tobacco industry denormalization or denormalization of tobacco industry marketing practices or products are articulated as goals for tobacco control; although they are generally seen to be instrumental goals that contribute to the attainment of the other three goals (i.e. prevention of smoking among children, protection from secondhand smoke, and encouraging and motivating quit attempts).

"Intervention approaches" refers to the nature of the intervention, i.e. whether they are policy-, program-, or media-oriented. "Intervention setting" pertains to the location or channel through which the interventions are delivered, e.g. home, workplace, school, restaurants and bars, other public places, health care setting etc. "Priority populations, targets, and audiences" is self explanatory and a wide variety of these groups are identified in Table 5.

"Other aspects of interventions" is the last sub-branch of the "Practice Integration" branch. It is further divided into three (3) sub-categories/twigs: "Cutting edge issues", "Equity", and "Integration". Essentially, "Cutting edge issues" are the tobacco control issues that public health staff are fully aware of that have not yet been adequately addressed through provincial public health policy. These are issues that are "on the radar screen" so to speak and will need to be addressed through future actions (e.g. definition of patios, drifting smoking in multi-unit dwellings, etc. [see list in Table 5]).

"Equity" is a major concern for all PHAs and they actively look for ways to engage high need communities and have their concerns recognized in the planning and execution of interventions.

"Integration" was raised previously under a wide variety of planning associated factors and it remains a concern at implementation. Effort is spent to attempt integration of tobacco control with other interventions (e.g. chronic disease prevention, child health, reproductive health, social determinants) and to integrate efforts within a comprehensive approach to tobacco control.

f. Time. The last mentioned branch is "Time". The time dimension was implicit in all of the above and in all interviews. Two (2) sub-branches/twigs bifurcate from "Time". These are "Era" and "History".

"Era" pertains to the time periods in the evolution of tobacco control in Ontario. There are three "eras" identified here. These are: (i) pre-1994, when early bylaws and programs were developed (including developments under the Mandatory Health Programs and Service Guidelines for healthy lifestyles first introduced in 1989 pursuant to the *Health Protection and Promotion Act*); (ii) the Ontario Tobacco Strategy and *Tobacco Control Act* era from 1994-2004 during which time municipalities were specifically enabled to pass bylaws and enforce the restrictions on smoking in their jurisdictions; and, (iii) the Smoke-Free Ontario strategy era post 2004, when substantial resources were invested in tobacco control and a province-wide smoke-free law and regulation in place.

"History" as a sub-branch pertains to two (2) related aspects of history: "Local historical developments" and the "History of tobacco control" more generally[10]. "Local historical developments" reflect the unique local historical developments peculiar to PHUs, as well as organizations working within them. These include failed bylaws, leadership toward 100% smoke-free bylaws, and relatively easy developments in later years for those following precedents in other local jurisdictions. "History of tobacco control" more generally refers to the fact that the international tobacco control movement has a long and credible history of science-based interventions. There is also now wide-spread public support for tobacco control in most jurisdictions (at least in Ontario) and tobacco control is recognized to be a mature movement. It is sometimes difficult for new professionals to enter the movement as many niches are already filled. (Even experienced tobacco control practitioners may have difficulty finding ways to re-enter the movement if they leave for a time.)

3. Phase 3 analysis – preliminary theory. For Strauss and Corbin (1998), a theory is "A set of well-develop concepts related though statements of relationship, which together constitute an integrated framework that can be used to explain or predict phenomena." (Strauss & Corbin, 1998; p. 15). Furthermore, they suggest that "Theorizing is work that entails not only conceiving or intuiting ideas (concepts) but also formulating them into a logical, systematic, and explanatory scheme" (Strauss & Corbin, 1998; p. 21) and "Theorizing is the act of constructing … from the data an explanatory scheme that systematically integrates various concepts through statements of relationship. A theory does more than provide understanding or paint a vivid picture. It enables users to explain and predict events, thereby providing guides to action." (Strauss & Corbin, 1998; p. 25).

Strauss and Corbin (1998; p. 146) suggest that deciding on a central category is a key stage in the development of a theory. "A central category has analytic power. What

[10] Note: At a later stage, these categories were re-conceptualized more broadly as time; the overarching branch level category is labeled "Time" in the models that follow. Tempo was added as a third time dimension following the review of social theories.

gives it power is its ability to pull the other categories together to form an explanatory whole."

In this subsection, a series of diagrams that document logical relationships in the data (interview transcripts and field notes) is presented. These diagrams start with the overall framework and a brief description of the systematic relationships amongst the categories. These models were developed as logical, systematic explanatory schemes to assist with the identification of the generative mechanisms (i.e. powers/potentials inherent in agents and structures, as opposed to the view of constant conjoining of "cause and effect" in patterns of occurrence) and public health practice contexts that can contribute evidence-informed tobacco control. As such, they were developed by the analyst based on his insights into the data (largely the interview transcripts but also the field notes, reflective notes, and supplementary documentation provided). As the theory was to be grounded in the data, examples of relationships found in the data are discussed throughout. Logical interpretations were also factored into this analysis and noted as such.

The model (Figure 2) of evidence-informed practice in tobacco control was formed from the highest level of categories (i.e. the branch level). "Interpretation" and "Decision-making" in this model have been separated and "Interpretation" is presented as a central category in the theory. "Experience" is added as a category along the feedback loop (note: As discussed previously, experience in tobacco control includes practice-based experience, some of which is documented in the form of evaluative studies). Recall that the "Interpretation and Decision-making" branch in the conceptual ordering analysis contained "Adapting and contextualizing", "Theories of action", "Social construction of knowledge", "Working knowledge and knowledge construction", and "Wisdom". "Social construction of knowledge" and "Working knowledge and knowledge construction" were complex sub-branches within the construct of "Interpretation and Decision-making". In the discussion that follows (related to Figure 4), they will be described as central sub-categories within the central category of "Interpretation."

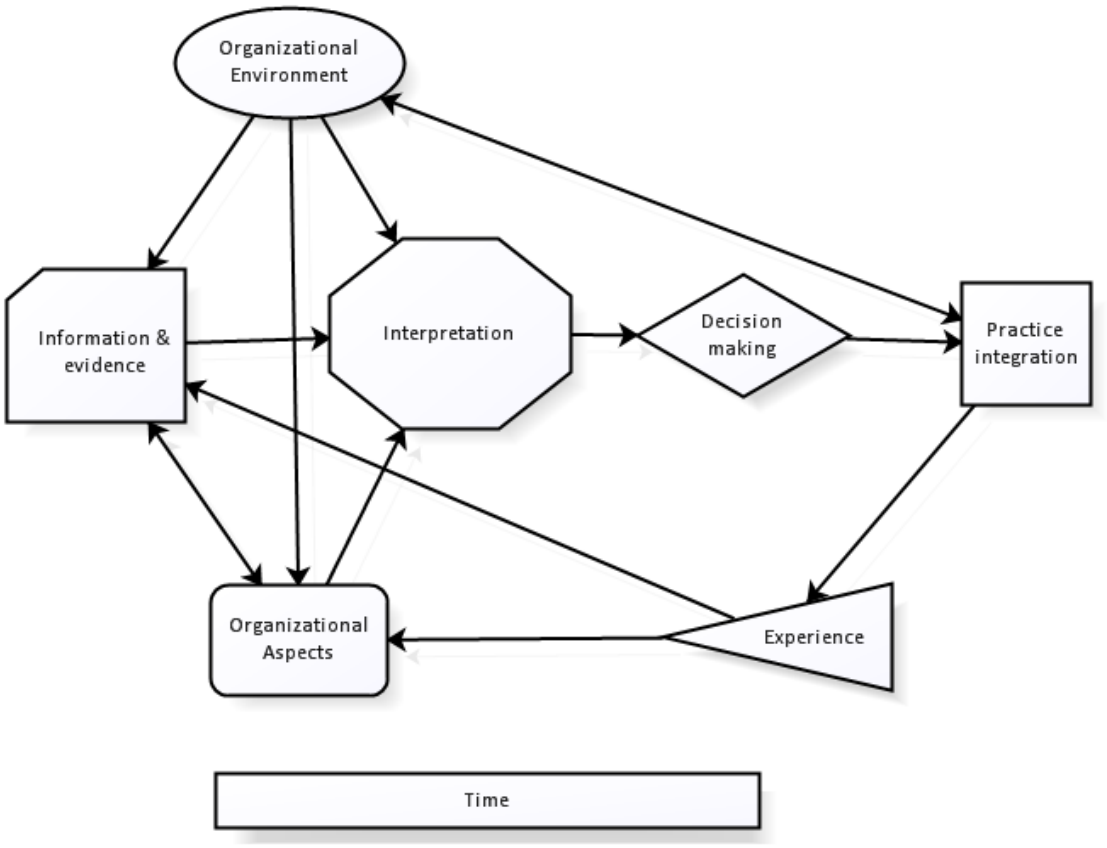

Figure 2: Model of evidence-informed practice in tobacco control

Various relationships are indicated by arrows in the model of evidence-informed practice in tobacco control. "Information and Evidence", "Organizational Environment", and "Organizational aspects" are seen as the three major categories of factors exercised on the social processes that make up the "Interpretation" aspect of the model. Each of these broad categories is of course a complex of sub-categorical concepts (discussed below).

The "Interpretation" of a wide range of information in turn leads directly to "Decision-making" and "Practice Integration". However, it is never straightforward. Information may be used in a variety of ways – to make instrumental decisions in choosing a course of action, to enlighten and inform the organization and for the development of the individual's and organization's stock of knowledge, to further justify previous decisions

(e.g. continuation of a program or policy) or presumed courses of actions (i.e. so-called symbolic or political use).

There is a reciprocal relationship between "Information and Evidence" and "Organizational Aspects". This is largely due to the fact that "Information and Evidence" are part of the organization as well. The availability of information resources and evidence-based reviews through libraries and other central resources is a constituent element of "Capacities and competencies". The demand for such information to be available as an input to "Interpretation and Decision-making" is driven by "Organizational culture" (e.g. vision of the organization and value places on evidence-based practice).

A one-way relationship is depicted between "Organizational Environment" and "Organizational Aspects" and between "Organizational Environment" and "Information and Evidence". The public health system requires that local PHAs have knowledge and capacity in tobacco control. Given the long history of tobacco control, one could argue that there are clear normative expectations amongst partners that the local health department be the expert on the science and practice of public health for this leading public health problem. This requirement relates largely to making a case to address the problem and the capacity for effective implementation, i.e. knowledge about what works and how it should be implemented in one's PHU, including collaborative relations with one's partners.

It is possible but not necessarily the case that there will be demands from many of the so-called "Critical relationships" (i.e. MHP, TCANS or their subcommittees) or any other aspects of the "Organizational Environment" that local health agencies need to generate independent information and evidence in tobacco control. Nevertheless, at the level of the health unit, there is inherent interest in evaluative and experiential information to improve quality and refine practice. There is also interest at a system level in learning from the experience across local health agencies about the implementation and impact of joint programs (e.g. Youth Action Alliances, compliance with the *Smoke-Free Ontario*

Act and Regulation). These forms of individual, organizational, and system level feedback are represented as feedback arrows to "Information and Evidence", "Organizational Environment" and "Organizational Aspects" in this model.

In addition to feeding toward "Organizational Environment", "Practice Integration" is seen also to be affected by it (hence the interactive arrow between organizational environment and practice integration). "Geography", existence of "Partners and Coalitions", and "Politics" will all affect "Practice Integration". "Critical relationships" and "Financial transfers" also have an effect, but indirectly so through building of organizational "Capacities and competencies" (i.e. an organizational aspect).

The following models depict putative relationships among sub-branches and major branches.

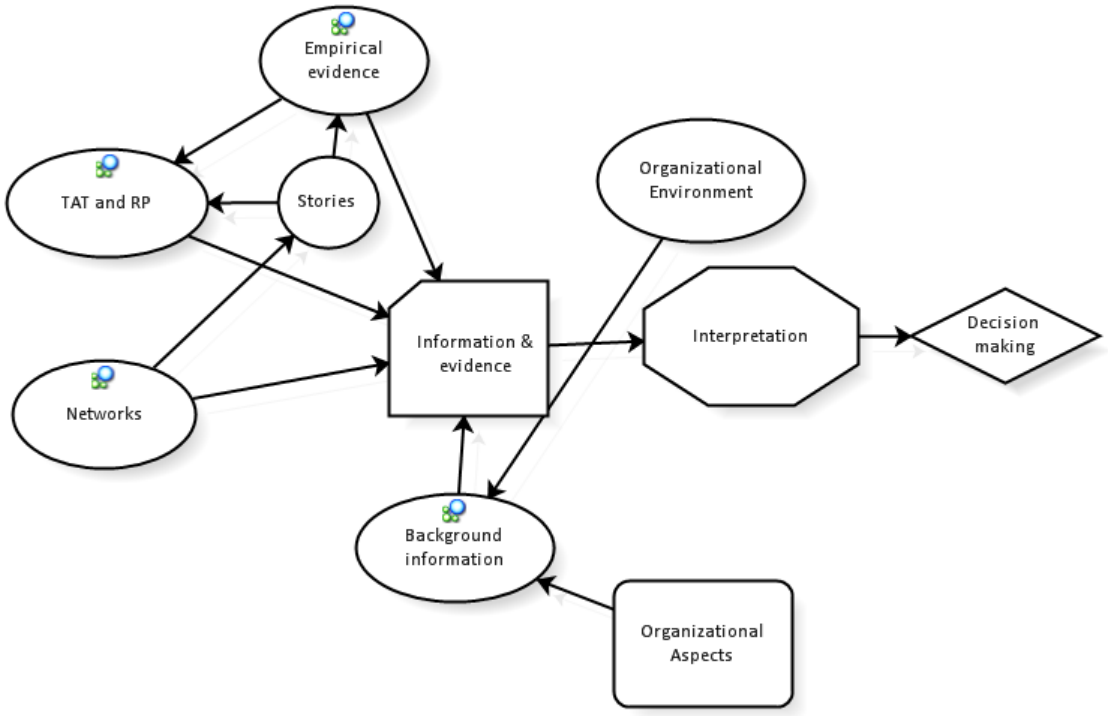

Figure 3: Information and evidentiary factors to be interpreted

Figure 3 depicts the relationships among various subcategories of "Information and Evidence" that are factored into "Interpretation and Decision-making". This includes

various forms of “Empirical evidence”, “Technical assistance and training”, “Networks”, and “Background information”. “Externalization” of experience in the form of stories from practice “Networks” finds its way into “Information and Evidence” and eventually through to “Interpretation and Decision-making” through practice “Networks”, “Technical Assistance and Training” and documented “Empirical evidence”. These stories find their way into the “Interpretation and Decision-making” process, whether they are formally sanctioned by the government, science establishment or “Technical assistance and training programs” or not. “Background information” is affected by understanding of organizational “Capacities and competencies” and well as key aspects of the “Organizational Environment” such as “Financial transfers” that are available to support local efforts.

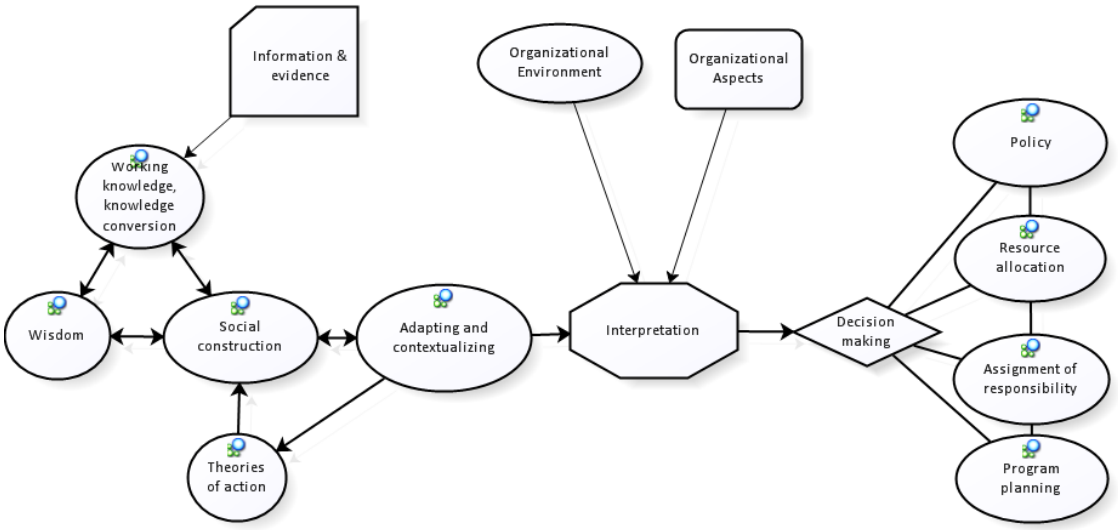

Figure 4: Interpretation and decision-making

Figure 4 depicts key relationships within the “Interpretation and Decision-making” core category. A critical step toward overall “Interpretation and Decision-making” is the process of “Adapting and contextualizing” knowledge considering “Local and regional circumstances”, “Adapting” (not adopting per se) interventions for PHU practice circumstances, and “Sense-making” of new information and ensuring that new interventions, knowledge etc. are relevant and workable for the local tobacco control practice environment.

"Social construction of knowledge" is also critical, as it provides the major content for the "Adaptation and contextualization" of knowledge. It is seen as a complex multifaceted process that is dependent on "Organization roles and responsibilities" and "Personal and organizational commitments, ownership and identity", both of which may impede or hinder knowledge development in the social context. It requires the "Engagement of internal and external partners and clients", determination of the "Social salience of information", and various "Social aspects of sharing, interpretation and learning". For many working in PHAs, there is also an "Action/practice imperative" which tends to hurry or hinder the process of social knowledge development until it is advanced to the actual practice of public health services (e.g. prevention programming, cessation counseling, or compliance monitoring and enforcement, policy development and implementation), rather than just considering and planning for them.

The "Social construction of knowledge" is affected by the "Working knowledge and knowledge conversion" that participants both bring to the process and engage in with each other. Several sub-categories of "Working knowledge and knowledge conversion" were also identified. These include the "Personal interests and frames of reference" brought by individuals, sometimes determined by their role in the organization. The "Practical utility" of attaining particular insights, awareness and knowledge, "Personal accountabilities", "Mindshare" as a proportion of total awareness that can be freed for knowledge acquisition, "Social processing" of knowledge related skills (e.g. systematic reviews, understanding them, and communicating them to colleagues) affect social construction. It also includes the tendencies of groups and the organization to facilitate and gain from story telling, combination and synthesis of various types of information as a social exercise, and learning by doing. These are all factors that contribute to the development of "Working knowledge and knowledge conversion" in public heath agencies. Personal inclinations toward concrete or abstract reasoning ("Level of abstraction") and access to technology all affect this critical function. It is also affected by "Wisdom" and experience of participants in the process.

"Theories of action" may be seen as particularly important in public health. The shared development of "Mental models and frames of reference", particularly "logic models" – for different levels of practice (i.e. macro and micro theories of intervention) are particularly important for social interventions. This is because social interventions are based on theories of particular mechanisms of action that are expected to achieve desired outcomes in social contexts. For this reason, there is an interactive/reciprocal relationship between "Adapting and contextualizing" and "theories of action". In short, information is taken in, processed, acted on, and there is learning from this experience (feedback arrows are not shown in Figure 4, as the focus is on the core category of interpretation and decision-making).

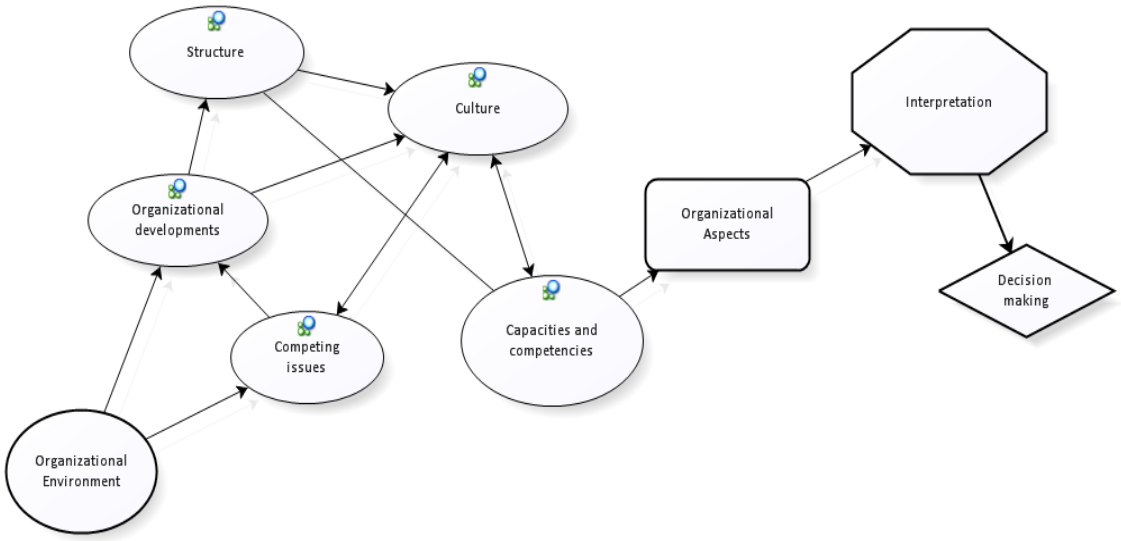

Figure 5: Organizational aspects factoring into interpretation and decision-making

Figure 5 outlines relationships within the "Organizations aspect" of the overall model. "Capacities and competencies" as related to total "Human resource" complement, knowledge, skills and abilities vis-à-vis interventions, "Cultural sensitivity and competence", "Relationships", "Surge capacity", and the "Multiple levels of the system" are all dimensions of "Capacities and competencies" that factor into the organizational aspects of the model. "Culture" – i.e. "Values", "Vision and mission related" dimensions, "Hierarchy / heterarchy", "Tolerance of error" and "Tolerance of discord" –

is affected by "Capacities and Competencies" and influences the degree of learning and capacity building within the organization.

The "Culture" is affected by "Structure" (also closely related to "Capacities and competencies" – solid line indicating an association conceptually) and both are affected by "Organizational developments" including amalgamation, regionalization, and perceived "Sustainability" of tobacco control. "Competing issues" also command attention and require resources, affect "Organizational developments", "Structure", "Culture" and may indirectly impact the "Capacities and competencies" for tobacco control practice. As noted previously in the discussion of the overall model, "Organizational environment" may directly affect "Organizational developments". These may be specific to tobacco control (e.g. consolidation of plans, new planning structures), or not (e.g. organizational growth, major restructuring) as in the case with increased, decreased, terminated or late "Financial transfers"; and "Politics" such a Provincial Government requirements to amalgamate municipal government have a direct and lasting impact. "Competing issues" are similarly affected by external "Organizational environmental" factors which in turn may impact on "Organizational developments" relevant to tobacco control.

Figure 6 depicts relationships amongst categories within the "Organizational environment". "Geography" and "Politics" are linked by virtue of the local political nature of PHAs, and local "Partners and coalitions" may also be active in political activity related to tobacco control (e.g. advocating bylaw changes). This is all associated with "Geography", tied to place (i.e. PHUs) and municipal structures and many other issues (e.g. population distribution, size, and composition). Each PHA also has its unique circumstances locally and its own unique "Critical relationships".

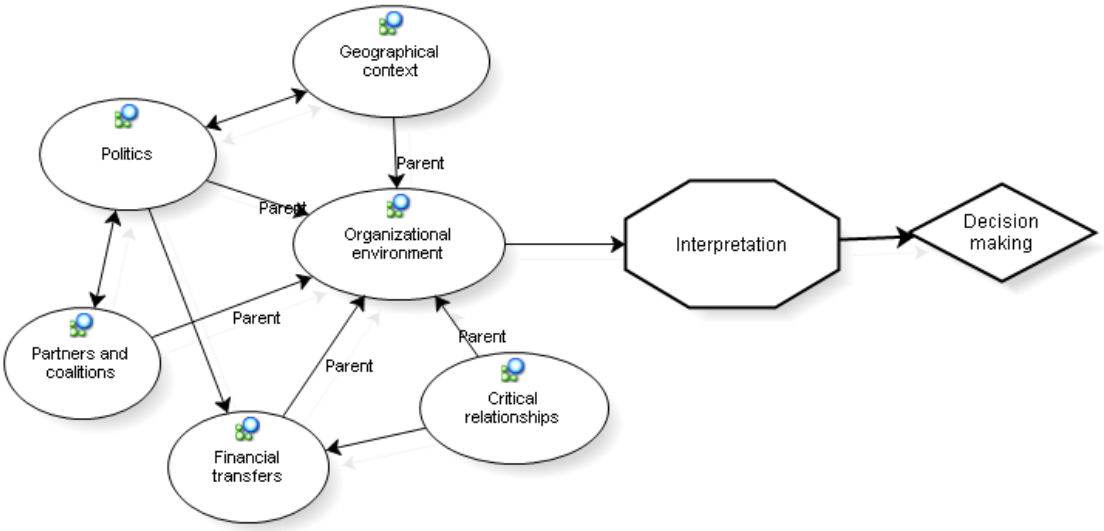

Figure 6: Organizational environment factoring into Interpretation and decision-making

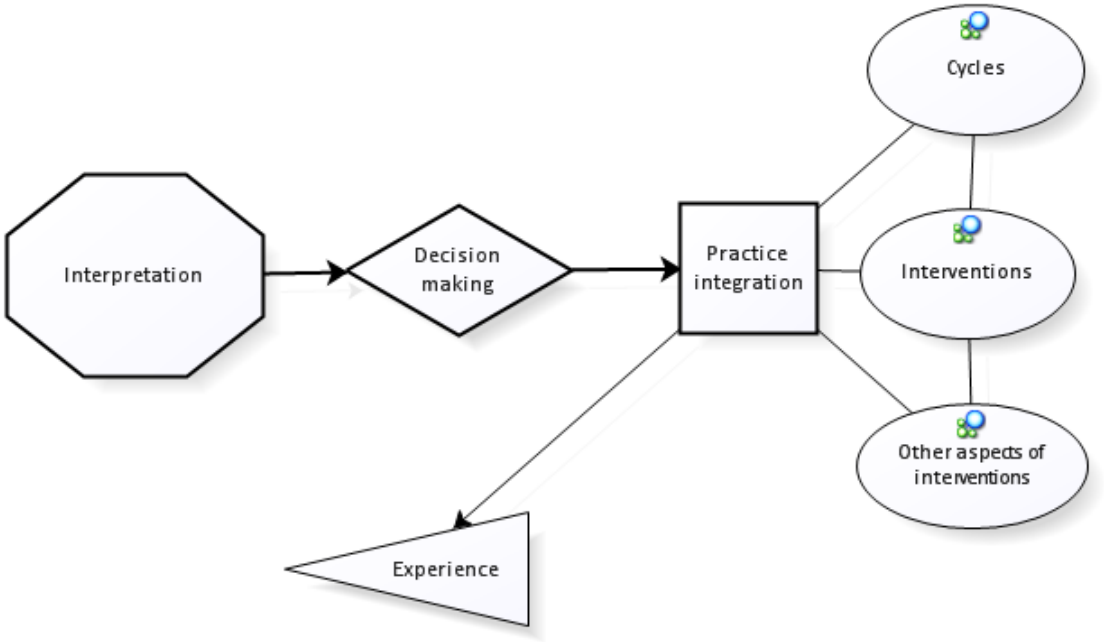

Figure 7: Practice integration factoring into experience

Figure 7 depicts the final elements of the model. The ultimate end is the integration of information and evidence through social knowledge construction and adaptation exercises to affect "Interpretation and Decision-making" outcomes. Decisions about the integration of socially constructed, adapted and contextualized knowledge will lead to the integration of this knowledge into practice (or not). The cluster of related decisions such as "Policy decisions", "Assignment of responsibility" including lead responsibility and work breakdown structure, "Resource allocation" decisions, and "Program planning" and coordination related aspects affect how new socially constructed knowledge is integrated into practice through various "Cycles" (e.g. routines, seasonal variations etc.), the "Interventions" to be delivered (i.e. as defined by goals, "Interventions", "Settings", and "Priority populations, targets and audiences"), and what will be the "Cutting edge issues" for future interventions. Last, but not depicted on the model (Figure 7), experience – in the form of stories, evaluations, scientific studies etc. – is fed back to and impacts on the "Information and evidence aspects" and "Organizational aspects" of the model, including "Culture", "Capacities and competencies" and other factors already discussed.

4. Phase 4 analysis – integration of social theories and reflections on initial hypothetical propositions.

1. Overview. To this point in the analysis, the original textual data were initially coded, integrated and elaborated through the creation of a conceptual ordering of categories, and preliminary models of evidence-informed tobacco control in PHUs were developed. A full and honest attempt has been made to ground the theory in the interview data.

While the analysis has been approached with an open mind, the investigator did not approach the analysis with an empty head (cf. Dey, 1999; p. 251). This is discussed at greater length below (in the discussion section). Alexander has suggested that "Social science disciplines are hermeneutic, not only discovering enterprises. Their explanatory, discovering theories are embedded in earlier, conventionalized understandings of pivotal texts. To put it another way, social science discoveries are textually mediated by the classics" (Alexander, 1998; p. 97). Alexander was commenting on the great works for Talcott Parsons. It might be said that it is wise to try to have a firm grasp of the obvious.

Nevertheless, the exhortation from one of the founders of grounded theory is to avoid forcing, but to read and be theoretically sensitive (Glaser). This is interpreted by the investigator that it is important to have an open mind during the coding and analysis process – and not to prematurely grasp what is apparent from prior theory until one has permitted the data to "speak for themselves", so to speak. Only then, would it be appropriate to look to theory for additional lens that might expose blind spots in one's analytic vision.

Therefore, following analysis of the data, the next step was to review the preliminary grounded theory in light of additional theories, specifically concepts that have appeared in extant social theories and the initial propositions that were anticipated at the outset after a reflection on the literature (i.e. the literature pertaining to knowledge exchange in health systems and business contexts and the utilization of social science and evaluative research). The propositions are found as Appendix E: *A Priori* Propositions.

2. Social theories and concepts. The review of social theories and related concepts was selective and deliberate. It was guided by the identification of some leading social theories and concepts cited in the literature about knowledge exchange and the use of evaluation reviewed in preparation for this study. In large part, they relate to issues of structure, agency, action systems, and aspects of practice. Table 6 presents these social science theories and concepts. It includes the theory or concept, author, notions that may be relevant, illustrative quotes, and the implications for the modification of the theory.

Table 6 – Social Science Theories and Concepts Potentially Relevant to a Theory of Evidence-Informed Practice in Local Tobacco Control Action Systems

Theory or Concept	Author	Notions that may be relevant	Illustrative quotes	Implications
Structure and agency (from a social realist perspective)	Margaret Archer (Archer, 1995)	Morphogenetic/morphostatic framework applied to structure and agency	• "…the morphogenetic/morphostatic framework is put forward as the practical complement of social realism because it supplies a genuine method of conceptualizing how the interplay between structure and agency can actually be analyzed over time and space. It is based on two basic propositions: (i) that structure necessarily pre-dates the action(s) leading to its reproduction or transformation; (ii) that the structural elaboration necessarily post-dates the action sequences which gave rise to it." (p. 15) • "historicity of emergence" (p.67) • "the Emergentist stands opposed to 'one-level' explanations, based on a homogeneous view of the social world, whether this be the 'psychology' of the upward conflationist, the 'sociology' of downward conflationist, or the 'social psychology' of the central conflationist." (p. 105)	• Supports inclusion of multi-levels and time aspects of the models • Suggests that emergent powers of agents and structures are time and place dependent • Structure, groups, and individuals already included in the model • This will assist with interpretation
Culture and cultural change (from a social realist perspective)	(Archer, 1996)	Morphogenesis and the morphogenetic perspective on cultural change	• "(i) There are logical relationships between components of the cultural system (CS). (ii) There are causal influences exerted by the CS on the Socio-Cultural (S-C) level. (iii) There are causal relationships between groups and individuals at the S-C level. (iv) There is elaboration of the CS due to the S-C level modifying current logical relationships and introducing new ones. Taken together they sketch in a morphogenetic cycle of Cultural Conditioning → Cultural Interaction →Cultural Elaboration." (p. 106)	• Culture is included in the model • Processes similar to the freezing-unfreezing-refreezing analogies from Lewin's force field concept may be instructive in understanding change processes (see discussion section)
Self consciousness, identity, primacy of practice, and humanity	(Archer, 2000)	Self consciousness as a basis for agential reflection; self reflection ("inner conversation") about material, performance, and social expectations, roles and intentions leading to commitments as a personal emergent property for actors developed within (cultural and structural) constraining and enabling circumstances	• "Our causal powers, which derive from our sense of self, are as real as the real world in which they emerged. Our selfhood is not a theory appropriated from the discursive realm, but is a real and causally efficacious property, emergent from practical action in a material context." (p. 312) • "Identity was held to hinge upon our concerns in the world, and the dilemma facing every human … concerns the natural order (about physical well-being), in the practical order (about performance competence), and in the social order (about self worth). Each concern entails intentionality; it is *about* features of the world. Since it is	• Personal emergent properties may be seen to arise from a dynamic psychology involving concerns about physical well being, performative achievement and self worth that are evolved to emergent order though processes of discernment, deliberation, and dedication to projects

Theory or Concept	Author	Notions that may be relevant	Illustrative quotes	Implications
			prioritizing of our ultimate concerns, and the accommodation of other concerns to them, which gives us our unique personal identities, then who we are subjectively depends upon our involvement with the objective world." (p.313)	
Social construction of reality	Peter Berger and Thomas Luckman (Berger & Luckman, 1966)	Social construction, social stock of knowledge, common sense, inter-subjective sedimentation	• "Knowledge about society is thus a realization in the double sense of the word, in the sense of apprehending the objectivated social reality, and in the sense of ongoingly producing this reality." (p 84) • "I live in a common-sense world of everyday life equipped with specific bodies of knowledge. What is more, I know that others share at least part of this knowledge, and they know that I know this. My interaction with others in everyday life is, therefore, constantly affected by our common participation in the available social stock of knowledge." (p. 56) • "Common-sense knowledge is the knowledge I share with others in the normal, self-evident routines of everyday life." (p.37) • "Only a small part of the totality of human experiences is retained in consciousness. The experiences that are so retained become sedimented, that is, they congeal in recollection as recognizable and memorable entities. … Intersubjective sedimentation also takes place when several individuals share a common biography, experience of which becomes incorporated in a common stock of knowledge. Intersubjective sedimentation can be called truly social only when it has been objectivated in a sign system of one kind or another, that is, when the possibility of reiterated objectification of the shared experiences arises." (p. 85)	• Social construction is part of the model • Social stock of knowledge is a nuance that can be added – i.e. notion that the knowledge is not only known but socially known to be a common basis for interaction • Suggests that there is a clearly normative aspect of shared knowledge and will eventually permeate every-day routines. • Retained memory of inter-subjectively held knowledge – particularly as part of "signs" (such as codification in laws, mission statements, public documents etc.) • These aspects are reflected as part of the contextualization and adaptation process
Realist social theory	Roy Bhaskar (Bhaskar, 1998)	Transformational model of social activity	• "Society is both an ever-present condition (material cause) and the continually reproduced outcome of human agency." (p.35)	• This is consistent with social constructionist approach to knowledge and reality • Assists with interpretation and discussion
Virtuosity and improvisation	Pierre Bourdieu (Bourdieu, 1977)	Excellence in practice is creative and artful	• "only a virtuoso with perfect command of his "art of living" can play on all the resources inherent in the ambiguities and uncertainties of behaviour and situation in order to produce the actions appropriate to each case. … the "art of necessary improvisation which defines excellence" (p. 8)	• Model should include non-conscious, unarticulated skills that individuals bring to the organizational process (i.e. not all included in conscious, articulated aspects as identified in interviews and field notes)
Time and tempo	Pierre Bourdieu	Time, tempo and historical context	• "Science has a time which is not that of practice. … The	• Not just time, as in day-to-day or

Theory or Concept	Author	Notions that may be relevant	Illustrative quotes	Implications
	(Bourdieu, 1977)		detemporalizing effect (visible in the synoptic apprehension that diagrams make possible) that science produces when it forgets the transformation it imposes on practices inscribed in the current time … is never more pernicious than when exerted on practices defined by the fact that their temporal structure, direction, and rhythm are constitutive of their meaning. (p. 9)	longer timeframes, but also the notion of temporal intensity or pace of work life should also be incorporated as integral to social processes • Individual roles are reflected in the model • The time category should be modified to include tempo/pace
Habitus as a confluence and reciprocal determination	Pierre Bourdieu (Bourdieu, 1977)	Enduring structures that shape practice	• "The habitus, the durably installed generative principle of regulated improvisations, produces practices which tend to reproduce the regularities immanent in the objective conductions of the production of their generative principle, while adjusting to demands inscribed as objective potentialities in the situation, as defined by cognitive and motivating structures making up the habitus." (p. 78) • "the habitus, the product of history, produces individual and collective practices, and hence history, in accordance with the schemes engendered by history." (p. 82)	• Patterns, routines, reciprocal interactions of practice and organizational culture are already included in the model • This aspect should be included in the notion of sustainability • Assists with interpretation (see discussion)
Parsonian theory of systems of social action	Tim Delaney (Delaney, 2005)	Social action embedded in actors' motivations, means, conditions, and social system	• "actors are motivated to action, especially toward a desired goal" • "actor must find the means to reach the desired goal" • "actor must deal with conditions that hinder reaching the goal" • "actor must work with the social system" (pp. 47-48)	• The overall model may be seen as a form of Parsonian system of social action • Assists with interpretation (see discussion)
Time spans – durée and longue durée	Anthony Giddens (Giddens, 1984)	Three part frame of reference for time and associated labels	• "durée of day-to-day experience" , "life span of the individual", "longue durée of institutions" (p. 34)	• This is a subtle point • Likely the "here and now" is most relevant, but the social construction of knowledge should be seen within the various horizons • While this relates somewhat to era, it is a different aspect and is added to the time category
Power	Anthony Giddens (Giddens, 1984)	Essential nature of power in getting things done	• "There is no more elemental concept than that of power. … Power is one of several primary concepts of social science, all clustered around the relation of action and structure. Power is the means of getting things done and, as such, directly implied in human action." (p. 283)	• Power itself was not identified in the interviews. However, it was implied in relationships, roles, responsibilities and actions within and external to the organization • Assists with interpretation (see discussion)
Social theory of	Anthony	Social theory of lay actors being concerned with	• "All social actors, it can be properly said, are social	• Supports the "theory of action"

Theory or Concept	Author	Notions that may be relevant	Illustrative quotes	Implications
lay actors	Giddens (Giddens, 1984)	practical utility, and potential for institutional distortion	theorists, who alter their theories in light of their experiences and are receptive to incoming information which they may acquire in doing so. Social theory is by no means the special and insulated province of academic thinkers. However, lay actors are generally concerned above all with the practical utility of the 'knowledge' that they apply in their daily activities, and there may be basic features of the institutional organization of society (including, but limited to, ideology) which confine or distort what they take to be knowledge." (p. 335)	and "mental models" subcategories • Practical utility is highlighted • Features of institutions that distort knowledge are identified • These aspects might be worked into the overall understanding of social construction of knowledge and related contextual interactions • Assists with interpretation (see discussion)
Intellectual virtues	Bent Flyvberg (Flyvbjerg, 2001)	Three kinds of knowledge, resurrecting Aristotle's intellectual virtues	• Whereas episteme concerns theoretical know why and techne denotes technical know how, phronesis emphasizes practical knowledge and practical ethics. Phronesis is often translated as "prudence" or "practical common sense" (p. 56)	• Three types of knowledge could be explicated as outputs of the social construction process • Assists with interpretation
Power dynamics	Bent Flyvberg (Flyvbjerg, 2001)	Six features of power, derived from Nietzche, Foucault, Weber, and others	• "six features: (1) Power is seen as productive and positive and not only as restrictive and negative. (2) Power is viewed as a dense net of omnipresent relations and not only as localized in "centers" and institutions, or as an entity one can "possess." (3) The concept of power is seen as ultradynamic; power is not only something one appropriates, but also something one reappropriates and exercises in a constant back-and-forth movement in the relations of strengths, tactics, and strategies. (4) Knowledge and power, truth and power, rationality and power are analytically inseparable from each other; power produces knowledge, and knowledge produces power. (5) The central question is how power is exercised, and not only who has the power, and why they have it; the focus is on process in addition to structure. (6) Power is studied with a point of departure in small questions, "flat and empirical," not only, nor primarily, with the point of departure in "big questions." (pp. 131-132)	• Power is reflected in interpersonal relations of the politics subcategory • Social realist methodologist see this as an aspect of causal/generative mechanism (Sayer, 1992; pp. 104-105) • Assists with interpretation (see discussion)
Historicity, historically effected consciousness, and horizons	Hans-Georg Gadamer (Gadamer, 2004b)	Historical consciousness, horizon and situation as a frame of reference	• "… historically effected consciousness … is an element in the act of understanding itself …" (p. 301) • "Everything contained in historical consciousness is in fact embraced by a single historical horizon." (p. 303) • "… essential to the concept of the situation is the concept of "horizon". The horizon is the range of vision that includes everything that can be seen from a particular vantage point." (p. 301)	• Interpretation in the model can be seen to incorporate the notion of historical horizons • Assists with overall interpretation (see discussion)
Everyday reality	Edmund	Lifeworld	• "The life-world was always there for man before science,	• Consistent with a social realist

Theory or Concept	Author	Notions that may be relevant	Illustrative quotes	Implications
	Husserl (Husserl, 1999)		then, just as it continues its manner of being in the epoch of science" (p. 364) • "the life-world, for us who wakingly live in it, is always already there, existing in advance for us, the "ground" of all praxis whether theoretical or extratheoretical. The world is pregiven to us…" (p. 375)	perspective at the "actuality" level of stratified reality • Assists with interpretation (see discussion)
Habitual routines as stages for social change	Stanford Lyman (Lyman, 2003)	Routines as the frequent, enduring aspects that occur without reflection but are a platform for change	• "Habitual routines are the stages from which the far more theatrical dramas of social change occur. Indeed, true, or fundamental, social changes … may be understood as occurring in an assault on established habits of life in the name of the proposed instauration of a new set of habits (or, to be more precise, habits-to-be)." (p. 255)	• Routines are already part of the model • Nuance added relates to the non-interpreted (pre-given) nature every existence.
Situational determination of knowledge	Karl Mannheim (Mannheim, 1985 (1936))	Social dimension of knowledge	• "In every concept, in every concrete meaning, there is a crystallization of experiences of a certain group. … In every concept, however, there is not only a fixation of individuals with reference to a definite group of a certain kind and its action, by every source from which we derive meaning and interpretation acts also as a stabilizing factor on the possibilities of experiencing and knowing objects with reference to the central goal of action which draws us." (p. 22) • "situational determination … the thought of every group is seen as arising out of its life conditions." (p. 78) • "… must start with the assumption that there are spheres of thought in which it is impossible to conceive of absolute truth existing independently of the values and position of the subject and unrelated to social context." (p. 79)	• Supports social construction notions and situational determination of life conditions • Distinctions between ideology and knowledge are made • A distinction is also made between "justified true belief" and "warranted belief"
Social emergence	R. Keith Sawyer (Sawyer, 2005)	Emergence and complexity paradigm	• "emergence – the processes whereby global behavior of a system results from the actions and interactions of agents." (p2) • "Complexity theorists have discovered that emergence is more likely to be found in systems in which (1) many components interact in densely connected networks, (2) global system functions can not be localized to any one subset of components but rather are distributed throughout the entire system, (3) the overall system cannot to be decomposed into sub-systems and these into smaller sub-systems in any meaningful fashion, (4) and the components interact using a complex and sophisticated language." (p. 5)	• Provides understanding about conditions likely associated with social change movements that "emerge" from properties inherent in agents and structures. • Assists with interpretation (see discussion)

Concepts identified in the table include the following:

- social realist's perspective morphogenetic/morphostatic change in structure and agency (Archer, 1995), culture (Archer, 1996), including humanity (self consciousness, self reflection, role of practice, identity, and commitment; Archer, 2000);
- social construction of reality, social stock of knowledge, common-sense, and intersubjective sedimentation (Berger & Luckman, 1966);
- transformational model of social action (Bhaskar, 1998);
- virtuosity and improvisation (Bourdieu, 1977);
- habitus – confluence and reciprocal determination (Bourdieu, 1977);
- Parsonian theory of systems of social action (Delaney, 2005);
- time spans – durée and longue durée (Giddens, 1984);
- power and power dynamics (Flyvbjerg, 2001; Giddens, 1984)
- social theory of lay actors (Giddens, 1984);
- intellectual virtues (Flyvbjerg, 2001);
- historicity, historically effected consciousness, and horizons (Gadamer, 2004b);
- everyday reality and "lifeworld" (Husserl, 1999);
- habitual routines as stages for social change (Lyman, 2003);
- situational determination of knowledge (Mannheim, 1985 &1936) ; and,
- social emergence (Sawyer, 2005).

After reviewing these concepts and theories, it was apparent that no additional major categories would be added to the model, as the model was sufficiently broad to capture elements identified in the review of additional theories. It should be noted however that the time concept could be further elaborated to include tempo (i.e. temporal intensity) as a sub-category (sub-branch). Furthermore, timeframe (durée, day to day, longue durée) relates to "era" but is a different categorization of the time dimension and therefore was added as a subcategory (sub-branch) of time. Insights from this review also assist with the interpretation of the data and inform the discussion section of this study.

c. Initial propositions. On review of the initial *a priori* propositions (Appendix E), the analyst did not identify any additional broad overarching categories that were not developed from the data (i.e. at the branch and sub-branch level). This suggests that the rich data and extensive coding has yielded a broad array of factors relevant to evidence-informed public health practice of tobacco control in local PHUs.

However, as with the review of the social science theories, there were a few detailed aspects that were not identified in the data. Moreover, while the data and models developed appeared to be confirming the general thrust of the propositional statements, some specific aspects were missing from the data. Specifically, there was no mention of law suits or freedom of information requests, although there was reference to the *Freedom of Information and Protection of Individual Privacy Act* by one interviewee. Also missing from the data was reference to "organizational slack" (i.e. Cyert and March, 1992; p. 42), although aspects of organizational capacity are undoubtedly associated with it.

Beyond this, the text of the interviews and the investigator's field notes may have used different terms to describe similar concepts previously identified in literature reviews. Therefore the categories generated during the analysis uses terminology that is not similar. For example, the terms "canonical practice" never came up in the interviews, nor did "tobacco industry rhetoric", or "collective minds". However, related ideas such as accepted practice, the need for denormalization, and shared understanding were reflected in the data. In some instances, it is clear that the data generated from the interviews went beyond the literature (e.g. notion of tolerance of discord).

d. Commitment to final category structure. Following this second last review of the categories, the analyst made a commitment to the final category structure. (Note: the final review involved member checks. However, to conduct the member checks and to reconstruct the cases on the basis of the conceptual model – sort of like putting humpty dumpty back together – it was necessary to commit to categories.) As noted, it has been modified slightly from the structure developed in Table 5 (Conceptual Ordering of the

Categories For Evidence-Informed Practice of Tobacco Control in Ontario PHUs). However, it has been modified to include further differentiation of the time category into tempo, time-frame, and era sub-categories. A summary of the final category (branch, sub-branch, and twig) structure is included as Table 7: Final Category Structure.

Case descriptions were subsequently developed on the basis of this structure. (As noted below, this category structure and the model did not change following member checks. However, some aspects of the case descriptions did change and these changes are reflected in the descriptions included as Appendix H: Thick Case Descriptions Used for Purposes of Member Checks (Modified to Take Account of Feedback Provided by Members).

Table 7: Final Category Structure

Branch	Sub-Branch	Twig
1. Information and evidence aspects	1. Empirical evidence	1. Evaluative research
		2. Externalizations
		3. Health assessments
		4. Scientific literature
		5. Surveillance and monitoring
	2. Technical assistance and training	6. Best practices, guidelines and systematic reviews
		7. Protocols and instructions
		8. Professional development
		9. Training and technical assistance
	3. Networks	10. Communities of practice and networks
		11. Reflective practice
	4. Background	12. Audits and accreditation
		13. Imperatives and obligations
		14. Mandatory Health Programs and Services
		15. Resource availability
2. Interpretation and decision-making	5. Adapting and contextualizing	16. Local and regional circumstances
		17. Adaptation to circumstances
		18. Sense-making
	6. Social construction of knowledge (and subsequent social construction of reality through actions)	19. Organizational roles and responsibilities, as well as organizational reporting lines
		20. Personal and organizational commitments, ownership and identity
		21. Engagement of internal and external partners and clients
		22. Social salience of information
		23. Social aspects of information sharing, interpretation and learning
		24. Action/practice imperative
	7. Theories of action	25. Mental models and frames of reference
		26. Logic models
		27. Micro and macro levels
	8. Wisdom	28. Frontline public health
		29. Local political feasibility

Branch	Sub-Branch	Twig
	9. Working knowledge and knowledge conversion	30. Personal interests and frames of reference
		31. Practical utility
		32. Complementarities
		33. Personal accountabilities
		34. Mindshare
		35. Social processing
		36. Level of abstraction
		37. Technological extensions
	10. Decision-making	38. Policy
		39. Assignment of responsibility
		40. Resource allocation
		41. Program planning
3. Organizational Aspects	11. Capacities and competencies	42. Human resources
		43. System specific
		44. Intervention specific
		45. Cultural sensitivity and competence
		46. Relationships
		47. Surge capacity
		48. Multiple levels of the system
	12. Culture	49. Values
		50. Vision and mission related
		51. Hierarchy / heterarchy
		52. Tolerance of error
		53. Tolerance of discord
	13. Organizational changes and developments	54. Major organizational developments
		55. Sustainability
	14. Potentially competing public health issues	56. Range of issues
	15. Structure	57. Organizational planning
		58. Structures for learning in the organization
4. Organizational Environment	16. Critical relationships	59. CAWG and Subcommittees
		60. Ministry of Health Promotion
		61. TCAN and Subcommittees
	17. Financial transfers	62. Provincial and local funds
		63. Cash flow
		64. Federal and US involvement
		65. Innovative grants
	18. Geography	66. Physical geography

Branch	Sub-Branch	Twig
		67. Local government structure
		68. Local organizations, cultures etc.
		69. Population
		70. Centres
	19. Partners and coalitions	71. Health care sector organizations
		72. Tobacco free councils
		73. University relationships
		74. Voluntary sector organizations and other community partners
	20. Politics	75. Local government
		76. Local-Provincial relationships
		77. Local interpersonal/professionally supportive relationships
5. Practice Integration	21. Cycles	78. Seasonal variations
		79. Funding cycles
		80. Routines
		81. Other cycles
	22. Interventions	82. Intervention approach
		83. Intervention setting
		84. Priority populations, targets and audiences
	23. Other aspects of interventions	85. Cutting edge issue
		86. Equity
		87. Integration
6. Time	24.Tempo	88. Slow
		89. Fast
	25.Time-frame	90. Durée
		91. Day to day
		92. Longue durée
	26. Era	93. Early-bylaws and programs
		94. Ontario Tobacco Strategy and Tobacco Control Act
		95. Enabled bylaws
		96. Smoke-free Ontario strategy
	27. History	97. Local historical developments
		98. History of tobacco control

5. Phase 5 analysis – validation through member checks

a. Overview. An important test of the validity of the model is confirmation of thick descriptions of individual PHA cases based on the model by the most knowledgeable people possible (i.e. the interviewees). If it is possible to think of the interview transcripts as the fabric from which the theory is constructed and the coding exercise as essentially ripping apart that fabric, would the interviewees agree with and endorse the pattern that the designer/analyst used to put back together the fabric to create a patchwork quilt? Might they recognize what is drawn together from the original pieces of fabric that they and others offered? Would it be seen as a credible, and maybe even realistic, reconstruction of the original materials into the new quilt? Might this be a functional (if not beautiful) quilt? Might they see it perhaps as strong material? Or, would it have major holes, requiring patches, or perhaps even be beyond salvaging and therefore should be discarded?

The ultimate test of the value of the work is whether it fits and works for those who are to be covered by it. Essentially, the member check provided this test. It involved a process of asking the original interviewees if they recognize the model as valid and workable, and whether it fits when applied to their own cases as thick descriptions (i.e. that were developed using model). According to Glaser (1998), fit, workability, relevance and modifiability are the criteria for judging the credibility and utility of grounded theory.

The investigator had a pragmatic purpose at the outset of this study (i.e. beyond contributing to social science theory and methods). One of the major purposes of this study was to understand and reflect interviewee advice about how regional, provincial and national organizations might better assist local tobacco control. The investigator made a personal commitment to bring these issues to the attention of public health policy makers and managers who might influence system changes consistent with these suggestions. Therefore, at the time of validation of cases by interviewees in a member

check, an additional opportunity was afforded for input (i.e. elaboration of points already made and an opportunity to make additional points).

The model, category structure, case descriptions, and advice offered about systems level changes to support local public health were sent to three people – two tobacco control managers and one director who served as a proxy for the tobacco control manager (as he/she supervised the position and it was vacant at the time of interviews). Three members were used so as to receive comments from well informed interviewees, and not burden all respondents who had previously been so generous with their time. Member checks were conducted over the phone, were not audio recorded, but the investigator did take notes.

b. Naming and describing the cases. The three health units were chosen so as to optimize the chances that the range of putative generative mechanisms and contexts for evidence-informed decision-making and practice would be identified. Specifically, two of the three PHAs selected were to be a TCAN or PHRED or innovative by virtue of early 100% smoke-free bylaws and early participation in the Youth Action Alliances. This was intended to increase the chance of being informed by interviewees in PHAs with internal resources allocated to organizational learning mechanisms and which may exist in socio-political environments that are conducive to tobacco control. The third PHA was selected so as not to fall in either of these categories and to increase confidence that findings and interpretations of the theory generated in this study might be more widely applicable.

It is clear that the "innovative" label is value-laden, at least in Ontario, Canada. It is more desirable to be innovative than not. All PHAs wanted to be recognized as being innovative in various areas of their practice and it was clear from the interviews that all three health agencies were indeed innovative in their own contexts. It was therefore decided to change case names from TCAN/PHRED, Innovative, and Other to "Urban", "Mixed Urban/Rural" and "Rural" PHAs. This was also noted earlier in this document.

The following is a brief characterization of selective aspects of the three cases. This description provides cursory information only about the cases and the reader is encouraged to review Appendix H which provides a much fuller description of the cases. Appendix H includes "thick descriptions" that were used for the purposes of member checks and subsequently modified to reflect member input.

Urban public health agency. The "Urban" PHA is very complex and is based in a large culturally diverse urban centre in Ontario. It has demonstrated its commitment to tobacco control over the long-term (since the 1970s) by its leadership in various aspects of tobacco control – including bylaw developments and innovative programming with community groups, as in other areas of public health practice.

It is organizationally very complex, having been reorganized within the last decade due the forced amalgamation of municipalities during the 1990s. The management structure in this PHA is elaborate, owing at least in part to the fact that it is such a large department (< 250 FTEs funded by under the *HPPA* chronic disease mandatory program and about 25 FTEs funded under the SFO), with a centrally organized trans-disciplinary accountability structure reporting through one director to the medical officer of health, with line-based assignment of responsibilities for enforcement, prevention and cessation programming. At the time of data gathering, there were four managers in the tobacco control program.

Under the leadership of one of the managers, the key internal PHA staff involved with the PHA tobacco control strategy was engaged in the redevelopment and refinement of the strategy and rethinking the coordination of all tobacco control efforts across the department and with community partners. Alignment of the tobacco control effort within an overall integrated approach to chronic disease prevention was also a priority and focus of activity.

The organizational culture is complex due to the amalgamation of previous PHAs into one. As a large PHA, it has substantial and highly differentiated functions and

organizational learning mechanisms – e.g. policy and planning, evaluation and monitoring, training and development, including professional leadership development. Evidence is valued, yet recognized to be but one input to decisions, including policy.

Senior people are well recognized and respected leaders in public health. Their personal experience and profile in tobacco control has contributed to the professional identities of the leaders interviewed. They have played senior roles such as being an advisor to the Minister, and have seconded staff to the Ontario Government to assist with the early implementation of the SFOS, including assisting with the drafting of SFOA regulations and enforcement protocols. The board of health has seen public health as an important policy and political issue. As a result, high profile engagement of the community and citizenry in public health issues is frequent – and tobacco control has benefited by virtue of the political and media attention that has been afforded to the issue in this PHU.

Mixed urban/rural public health agency. The "Mixed Urban/Rural" PHA also has a history of leadership in tobacco control. Prior to the passage of the 100% smoke-free bylaw the PHA had close working relations with the local interagency council on smoking or health. This relationship and experience in advancing local bylaws provided a very useful model for other PHAs, as this PHA and the interagency collaborated to support regional council's progressive leadership that led to the region being among the first municipalities in Ontario to pass a 100% smoke-free bylaw (note that the definition of 100% smoke-free may make several municipalities claim this honorable position).

The PHU is substantial in size, but has less than 500,000 people living in a relatively large geographic area (> 1000 square kilometers), with the vast majority (> 85%) living in urban centres.

Much of the developmental leadership on the smoke-free issue occurred before the current medical officer or tobacco control manager were hired. These two individuals were among the interviewees. In addition, a manager of environmental services whom had a played an initial lead role with respect to the enforcement of the smoke-free bylaw

and a health planner/promoter who chaired the local interagency council and coordinated efforts between the advocacy group and the PHA during the major activities leading up to the passage of the bylaw were interviewed.

There is a tobacco control unit in this PHA, which is (or was) also a key partnering organization that organizes and provides province-wide training and technical assistance to partners in the strategy. This unit is under the direction of the tobacco control manager, who is accountable to the medical officer of health. The environmental health services manager is now largely in a consulting role, and yet has a couple of staff involved in some aspects of tobacco enforcement, whereas the remainder of the compliance and enforcement related tobacco control activities are implemented through another municipal department (licensing and inspection). The PHA has a strong culture of evidence-based planning and evaluation, with a health planner assigned to each public health program (including tobacco control) and a strong central resource supporting health policy, planning and evaluation. Accountability for programs is a priority (among other values).

The department has doubled in staff size in the passed half dozen years or so. There are now about 10 FTE funded under the SFOS and about 18 FTEs funded under the chronic disease mandatory programs pursuant to the *HPPA*. The medical officer is a recognized leader in the Association of Local Official Health Agencies, and his/her staff is playing a major role in supporting the execution of the SFOS province-wide. They were also a large inspiration for many other PHAs and the Province as they advanced efforts to achieve 100% smoke-free public places (i.e. before the SFOA).

Rural public health agency. The "Rural" PHA is in the midst of a major organizational transformation in which full staff participation and emergent leadership is being facilitated. The general developments in the PHA transformation are to some extent reflected in the tobacco control effort, although the tobacco control effort has been clearly established as a separate and unique entity within the PHA.

There are about 6 FTEs funded under the SFOA and 10 funded under the chronic disease mandatory public health program. The chief executive officer/medical officer of health function in this PHA was – and still is and will be – a responsibility shared between a medical officer of health and an executive director, the latter having extensive experience in public health nursing and management.

The PHU is large and rural, with a population of less than 100,000 people, and no public transportation system. During the summer months, the population is reported to expand three-fold due to the presence of recreational waterfront in the county and recreational population associated with it.

The PHA is organized into 5 trans-disciplinary divisions (called quadrants) and the tobacco control program is nested as a distinct unit under the director responsible for healthy environments.

This PHA is totally committed to addressing the social determinants of health. To do so it is flattening the organizational structure and empowering staff to integrate their public health practices so as to meet the needs of clients in communities across the county. This includes integrating smoking cessation into, for example, home visits or programs to promote healthy babies and substance abuse prevention and treatment programs.

The organization encourages and engenders full staff participation in planning and reflection on practice. It is also similarly committed to evidence-informed practice, accountability, and quality assurance. Senior management in this PHA is recognized also for their innovative leadership in their PHA's reform and for their commitment to a community-oriented and engaging approach to community-based health promotion. As such, their expertise is sometimes sought out during provincial consultations and they participate in provincial advisory committees. Nevertheless, there are communication issues in relating to the MHP. While somewhat geographically isolated, the senior management and tobacco control staff is well connected with regional tobacco control structures (manager recently left his/her position and assumed a responsibility regionally

as a TCAN coordinator) and at least two health science centres. The staff takes pride in being innovators in rural public health.

Thick case descriptions for the three cases, that were used in and modified following the member check, are included as Appendix H. A brief summary is presented in Table 8 (Three Tobacco Control Action System Cases, Including Comments on Similarities and Differences).

c. Questions used in the member check. Interviewees had the opportunity to comment on anonymous case descriptions, the overall model (including graphics and tables describing the tree structure or categories), the combined set of advice about system changes constructed from all interviews, notes, and other documents. Specifically, each interviewee was asked:

- Does the overall model (i.e. figure and table) reflect your understanding of the factors associated evidence-informed decision-making and practice in your PHA?
- Does this case description reflect tobacco control decision-making and practice in your PHU?
- Do you have any advice about how the model or narrative descriptions should be modified?
- Do you have any additional advice or comments on the compiled list of possible system changes that should be considered at regional, provincial, or national levels to facilitate effective tobacco control in you PHU?

Table 8 – Three Tobacco Control Action System Cases, Including Comments on Similarities and Differences

Branch category	Tobacco Control Action System			
	Large Urban Centre Context	**Mixed Urban/Rural Context**	**Rural Context**	**Comments**
Information and evidence	• Orienting to strategic plan • Sophisticated, well resourced library, policy, planning and evaluation functions • Access to scientific evidence, professional syntheses, networks at provincial and national level • Good access to internal and external training programs • Dissemination through team structures • Long-standing personal histories, identifies and accomplishments in tobacco control	• Good resource centre • Strong central resources for policy, planning and evaluation • Organized professional and inter-professional development • Actually organizes training events • Manager has strong evaluation background • Depth of experience was lost and now being regained in tobacco control	• Linkages to PHREDs and Health Science Libraries • Value field knowledge and frontline workers' insights • Major concern with social determinants of health • Substantial sharing of information and opportunities for training • Undergoing accreditation at time of interviews	• All have access to same provincial resource centres • All report consideration of evidence • All consider evidence important but not sufficient • Must contextualize and fit to local circumstances • Larger units have greater and more specialized capacities • All value cultural aspects, social determinants • Empowerment of frontline most obvious in smaller PHA
Interpretation and decision-making	• Sophisticated intellectuals • Complex responsibility/management and decision-making structure • Cross-disciplinary and within disciplinary lines for tobacco control • 4 managers • Community interaction through TCAN and working with other TCANS and organizations • Use of logic models and project management techniques • Value frontline input, but not systematically collected and analyzed	• Strong business orientation, get the job done, be accountable approach • Integrated into senior management team and delegated responsibility structures • Working relationships with community agencies (e.g. YMCA) • One manager for consulting centre and local tobacco control unit • Management team processing of decisions • Nursing professional practice and regularly scheduled skill building sessions	• Social determinants of health lens • Multidisciplinary • Staff empowered at the frontline • Tobacco control not-well connected with rest of organization, but improving • Good reliance and working relationships with TCAN	• Clear attempt by rural PHA to empower staff • TCAN provides strong network for learning and consistency of application particularly vis-à-vis the SFOA • Social processing of information through formal and informal structures • Responsibilities determine social network for interpretation (may be cross disciplinary)

Organizational aspects	• Post amalgamation, building single organizational culture out of previous PHAs • Strategic planning and direction • Leadership development • Clear mutual respect among program lines	• Doubling of staff complement in past six years • Enforcement conducted by sister department in local government • Constant staff turnover • Small and developing staff • Unionized environment • Slow in hiring new staff	• Organizational changes seeks to flatten decision-making structure • Manager missing, recruited to TCAN • Interdisciplinary quads, full staff participation • Home/family feel • Team meetings • Experience comes from outside organization, but also walks out the door • Single tobacco enforcement officer • Concern with personality colors	• Varying size, complexity, hierarchy/heterarchy • All tolerate error, but expect learning • Knowledge dependent on staff
Organizational environment	• Huge population • Diverse, multicultural environment • Supportive city council and board of health	• Supportive council, supportive interagency, and many supportive businesses and university prior to bylaw • Various urban centres, diverse populations, rural cultural character is distinct • Supportive board of health/council	• Rural, no public transportation • Long travel times • Small town/rural politics • Supportive board of health/council	• All boards supportive • Good working relationships with neighboring PHAs and TCAN • Frustrations with MHP re: demonstration programs, communication, cash flow • All dealing with wide range of competing issues • University relationships in all instances, but out of rural PHU
Practice integration	• Planning to integrate all aspects of tobacco control, i.e. mandatory programs and SFO strategy programs • Looking to integrated with chronic disease prevention • Commitment to comprehensive integrated and expanding tobacco control effort	• Focus almost exclusively on SFO, decided mandatory programs covered by SFO and diverted funds to other issues • No plan for integrating with chronic disease prevention, but may occur in future and/or through site-specific interventions (e.g. workplace health promotion) • Interventions largely limited to SFO strategy	• Integrating most everything under a social determinants of health umbrella • Interventions largely limited to SFO strategy, although interest in integration of tobacco control with broader social determinants of health interventions (examples given)	• Organizational cycles for operational planning, seasonal program variation (e.g. enforcement of non-smoking on patios, NNSW, WNTD) • All aware of cutting edge issues • Larger tax bases of more populated centres permit larger programs/staff
Time	• Reference to since TCA, since 1997 bylaw, pre/post amalgamation, since SFOA	• Reference to TCA, pre/post 100% smoke-free bylaw, since SFOA	• Expected daily routines in tobacco control • Refer to pre-/post-TCA, bylaw, and SFOA	• Variation on pace • Common history re: provincial government policy

d. Feedback about the model, category structure and case descriptions. As mentioned above, feedback about the model, category structure, case descriptions, and system changes were solicited from two tobacco control managers and one director in the three PHAs. In all cases, the model and category structure were seen to be valid – reflecting the individuals' understanding of the factors associated with evidence-informed decision-making and practice in their PHA/PHU.

One respondent said "The model, the table of factors, and the summary of the health unit are all very well done". "Clearly, you have a well grounded understanding of what happens here in tobacco control." Another said, "It certainly works. There are a few errors of fact in the description though, that I would like to point out". Yet another said, "I read this through and you've certainly captured it – it rang true. It was heartening to read this." It was explained that it was helpful to see the experience and reality of PHA through lens offered by the model and it was nice to see that the effort and the thoughtfulness of professionals came out so clearly. This was encouraging and it was suggested that, at least in the one PHA, that they would like the investigator to make a presentation and discuss the implications of the model for improving practice in their PHA.

One interviewee compared to a model to a framework developed by Maureen Dobbins' (McMaster University) which was based on diffusion of innovation theory – suggesting that the model developed in this study was more comprehensive and systems-oriented, with feedback loops based on experience with practice. Both models were seen as useful. However, the new model was seen as an additional contribution to thinking. It is also seen as specific to public health and that was seen to be valuable.

About the case descriptions, in each case, there were comments about content. Perhaps the most problematic aspect of the case descriptions was failure in the Mixed Urban/Rural PHA case to clearly differentiate historical experience (pre-100% bylaw) from current experience.

In all cases, there were some suggested wording changes. Changes to the case descriptions were made in each case and these are reflected in the revised versions included as Appendix H.

e. Advice about provincial, regional, and national assistance for local tobacco control. During the interviews, interviewees were asked for their views and asked for advice about what additional supports that might or should be considered at the regional, provincial and national levels to assist them in advancing tobacco control practice locally. There was recognition that the Provincial Government has exercised leadership, passed legislative reforms, and increased investments in tobacco control. Gains have been made as a result. Specific areas of comment and advice are listed in the following table. No major substantive points were added following the member check. However, the notion of prosecutor training was dropped, as it was suggested that low volume of charges that are now apparent would be better handled through a cooperative arrangement between the MHP and Ministry of Attorney General that ensured uniform or standard prosecution by Provincial Crown prosecutors. The table also reflects editorial changes made as a result of the member check.

Table 9 – Additional Supports From Regional, Provincial and National Levels

1. ***Vision and Leadership.*** Clarity of vision and direction, leadership and guidance is *necessary, perhaps critical.* It contributes credibility and momentum to local public health issues.
2. ***Active Engagement.*** There is a need for more regular and active engagement by the Ministry of Health Promotion. There is a sense in the field that PHAs have created a number of program resources which could be shared with other PHAs across Ontario.
3. ***Multi-level Interactive Partnership.*** Tobacco Control Area Networks facilitate coordinated planning, information exchange, and training for PHAs and non-governmental organizations in the regions. However, there is a need for *greater communication* about what happens at the Community Action Working Group level to the field. The promise of interactive multi-level engagement is not realized as yet. As a result, the transfer of local and regional learning across the province has not occurred to the extent that it should.
4. ***Funding Allocations.*** There is a need to evaluate the balance of funding that is allocated to staff positions for the actual delivery of tobacco control interventions relative to training, technical assistance, and other provincial resources.
5. ***Timely, Consistent Direction.*** There is a need for timely, clear and consistent direction, respectful communication (communicating to public health staff before communicating to others, e.g. owners/proprietors), information, and support to the field from the Ministry of Health Promotion with respect to the enforcement of the *Smoke-Free Ontario Act* and regulation.
6. ***Commitment to Public Health Principles.*** Public health needs to be the overriding consideration in making decisions about how statutes and regulations should be applied.
7. ***Legal Support.*** In areas of the province with inadequate legal support, the Ministry of Health Promotion should ensure that *Smoke-Free Ontario Act* enforcement staff is supported well for prosecutions. This requires inter-ministerial dialogue and agreements to assign Crown prosecutors to the small number of cases that must be prosecuted.
8. ***Tobacco Information System.*** The Tobacco Information System being developed for enforcement and compliance related activity needs to be available to local PHA staff, as it is needed to effectively track enforcement related activities locally. The system must be modified to provide meaningful output for local tracking and management decision-making.
9. ***Greater Provincial Staffing***. There is a sense that, at the Ministry of Health Promotion, there is inadequate staffing. Staff currently working at the Ministry is respected. However, there is a sense that there is not enough staff – particularly senior and experienced staff – working at the provincial level and there is a need for staffing to be enhanced.
10. ***Administrative and Communication Delays.*** Administrative or political announcement related delays are harming local program activity. These delays need to be eliminated or substantially reduced, at the same time respecting the need for proper administration and communication of the program.
11. ***Mandatory Programs.*** Clarity around expectations for mandatory programs and accountability for them may help make the case for additional local investments in public health priorities. Local initiatives need to be meaningfully linked to provincial initiatives, with sufficient decision latitude to permit implementation to be appropriately tailored to the local level.
12. ***Public Health Human Resources***. There is a need for a provincial public health human resources and overall capacity building plan. This should include assessment and continuing education for core competencies. Models from schools of public health in the United States should be considered for training all professional staff in core competencies. Greater numbers of qualified public health professionals need to be recruited, properly trained, and retained. Systems of compensation need to provide a clear career path for public health professionals. Succession planning needs to be instilled as a process at all levels of the public health system. Recruitment to public health should begin as early as high school.

VI. Discussion

A. Introduction.

This section discusses substantive, methodological, philosophical, and practical aspects of this study. It is organized as follows. First, the research questions that were posed at the outset of this study are addressed. Answers are given to the overarching research question, and the specific research questions. Throughout this section, the three cases are discussed with respect to similarities and differences, as well as the implications of the differences for the grounded theory of evidence informed practice.

Second, methodological strengths and limits of the current qualitative study are identified. This methodological discussion addresses: (i) the data gathering approach (i.e. structure of the qualitative interview, demand characteristics, and data quality and limits); (ii) limitations of case studies at a single point in time – particularly limitations to analytic dualism and the study of emergent properties of people, cultural, and structural systems; (iii) issues pertaining to grounded theory (theoretical sufficiency/saturation, avoidance of forcing, staged approach to analysis, confirmatory role of literature and extant theory in the analysis); (iv) the use and integration of various inferential techniques (i.e. induction, deduction, and retroduction); (v) the credibility of the findings of this study (including the application of a member check, documentation of the decision trail, disclosure of personal history and perspectives etc.). This includes a brief assessment of the strength of the method employed for the construction of a grounded theory of evidence-informed tobacco control practice in Ontario PHAs.

Third, the ontological and epistemological perspective on which this study was based is briefly described and discussed. Specifically, this subsection deals with a critical realist perspective on reality, knowing and judgment as a form of weak social constructionism (e.g. transitive and intransitive dimensions, stratified reality, synchronic and diachronic causation, transformational model of social change, positional relativity and fallibilism). Other perspectives that informed the thinking of the investigator during the analytic phase of this study (particularly Kantian notions about the transcendental deduction of

categories, philosophical hermeneutics and phenomenology), and the case that these are not at variance from a critical realist perspective to social theory construction advanced here, is also discussed.

Fourth, the implications of this study for social theory, public health practice, and methods are discussed. At the outset it was anticipated that this study would make a contribution in three areas: (i) a practical contribution to working lives and performance of TCCs and public health system performance through a better understanding of the role of knowledge workers and how they can be better supported by policy, strategies for knowledge exchange within public health, mass communications, research institutions, evaluation and monitoring, and funders (contribution to public health practice); (ii) a theory of information and evidence use by knowledge workers in an important public health action system – focusing on the social construction of knowledge and policy/program reality of tobacco control at the local level (contribution to social science knowledge); and, (iii) demonstration of a method for social inquiry and evaluative research that may have application in other areas of knowledge exchange-related research and practice (contribution to social inquiry and evaluation practice). Each is discussed.

Fifth, and last, the discussion culminates by offering a few final reflections on the role of "critical" realist theory in health promotion, as well as the role of critical realist practitioners and scientists in social change, and the emergence of a new paradigm of research based on partnerships by policy-makers, practitioners, and researchers that contribute value through new jointly created perspectives and effective actions. The reasons for optimism are also discussed.

A. Addressing the research questions.

1. Overarching research question. The overarching research question that was used to guide the development of the theory of evidence-informed tobacco control practice was as follows:

> How do tobacco control coordinators as putative change agents and stewards of tobacco control resources, and other public health professionals, within their public health action systems incorporate new sources of information/evidence into the working knowledge and practice of tobacco control (through which mechanisms and in which contexts)?

The most obvious and general answer to this question is that the incorporation of new sources of information/evidence into the working knowledge and practice of tobacco control is a very complex process indeed.

A plethora of concepts have been identified in the category structure in this study. All were identified by the interviewees as having some bearing on decision-making and practice of tobacco control in their PHA. However, the relative importance of each category (branch) and subcategory (sub-branch and twig) depends on the tobacco control issue (e.g. prevention, cessation, or protection effort), the time horizon for the development of the strategy (e.g. whether it is prior to a policy decision, or following one and deciding on implementation options, or tailoring and adapting approaches to local circumstances), the interpretation and decision-making processes and expectations (e.g. authorities for decision-making) in the organizational (internal social) context, and the organizational (external) environment.

The interviewees were the senior staff responsible for the direction, management and evaluation of tobacco control activities within their respective PHAs. However, each PHA was structured differently, situated within unique geopolitical circumstances, and with the own unique histories of tobacco control. In addition, each PHA has its unique organizational structure, decision-making and accountability structures, organizational cultures, and organizational capabilities for information processing, analysis, and

decision-making, executing action, and evaluating and learning from their experiences. The histories of each PHA varied substantially, although they all shared recent experiences with the implementation of provincially-led tobacco control interventions under the Smoke-Free Ontario strategy.

While there were clearly differences amongst the PHAs and substantial complexity in the public health decision-making and practice contexts, several commonalities existed amongst the PHAs and certain consistencies of responses across interviewees, suggesting that various broad categories (i.e. at the branch and sub-branch level of the ordered categories) of information/evidence and background considerations are important regardless of context (i.e. organization and more specific actions systems within which individuals are situated). These generally relate to the Aristolean intellectual virtues (cf. Flyvbjerg, 2001) and aspects of social cognitive (cf. Bandura, 2001) and planned behavior theories (Ajzen, 2002; Ajzen & Fishbein, 2005) discussed in the literature review (see also Appendices C, D, and E). Knowledge about (a) what works (e.g. program efficacy and effectiveness – i.e. related to outcome expectations, and associated importance of outcomes), (b) how to implement tobacco control interventions (e.g. cultural sensitivity, setting specific considerations – i.e. affecting efficacy expectancies), (c) practical social and political considerations (e.g. acceptability to the community, conservative/liberal social values, and willingness to pay for interventions or receive funding from the Ministry of Health Promotion – i.e. related to subjective normative beliefs and motivations to comply with others' expectations) – which are also affected by organizational capacity (e.g. size of work force, experience) and context (e.g. urban-rural mix, population density and characteristics such as culture and other socio-economic factors) – all appear to factor into decision-making and practice. However, local circumstances (e.g. competing demands, constraints and enablements) and time considerations (e.g. pre-post policy decisions, tempo and pace of considerations and decision-making) affect the salience of the various categories of consideration (i.e. salience of information and evidence, organizational environment, internal organizational aspects) for decision-related analyses, how these considerations are processed (e.g. social construction of knowledge, contextualization, local theories of action), decisions and

actions by PHA professionals. A recent thesis by Elissa Bonin (2007) documented the importance of organizational commitment and receptiveness, leadership supportive of evidence-informed practice, organizational mandates and prior experience in using evidence in contributing to knowledge use. External factors such as external working relationships, processes/procedures, external mandates, and resources were also found to be associated with use.

Decision-making responsibility was diffused or shared in all PHAs. Within all PHAs that were part of this study, there was a variety of actors who assumed various responsibilities for aspects of the total tobacco control strategy. These included those whom were interviewed – medical officers of health, tobacco control managers, directors of environmental health responsible for SFOA and local bylaw enforcement, and those responsible for management oversight of cessation and prevention interventions.
While the TCC is the person who represents the PHA to the TCAN in their region and the MHP, the lines of authority for decision-making within the PHA are determined by the hierarchical delegation of responsibility structure that is particular to each PHA.
At the outset, the thesis committee cautioned about focusing solely on the role and functions of the TCCs as opposed to the broader decision-making structure. This was well founded advice.

Major decisions about the overall structure and direction of the tobacco control program and its relation or interface to other initiatives (e.g. chronic disease prevention, public health nursing programs such as healthy babies/healthy children, environmental health etc.) inevitably involved senior management, including the medical officer. Furthermore, apart from major program shifts such as the introduction and enforcement of a new local bylaw or setting out the overall direction for an integrated tobacco control strategy, decision-making occurs within lines of responsibility as decisions accrete and knowledge has its influence through creep into the practice environment (Weiss, 1980). This is particularly the case in instances where application of specific interventions is either mandated (per the HPPA) or funded 100% by MHP. This is essentially a different kind of "evidence use" described by Weiss as mandated use (Weiss, Murphy-Graham, &

Birkeland, 2005). Specific nuances and a discussion of the implications of similarities and differences are discussed with respect to the specific research questions (below).

2. Specific research questions. The specific research questions used to guide the development of the grounded theory were articulated earlier in this thesis. These are restated here and then answers to each of these questions are discussed in turn.

a. Roles of various sources of information with respect to working knowledge development and practice. For TCCs and other public health professionals, what are the roles of the following sources of information in working knowledge development and practice? (Sources identified *a priori* were: empirical evidence of various forms; technical assistance and training; reflective practice and experience; communities of practice; background information of various forms; knowledge conversion in the organization; PHA culture; PHA structure; community partners; political, economic, technological, and/or social external factors.)

PHAs identified many sources of information and evidence that were organized into four broad categories (empirical evidence, technical assistance and training, networks, and background information) which were further subdivided into 15 various specific sources of information. All PHAs reported using scientific literature, including systematic reviews, as a regular part of their practice. Health assessments are a mandatory aspect of the public health programming in Ontario and it is perhaps not surprising that each PHA had an epidemiologist (or multiple epidemiologists and analysts) on staff. Needs assessments, regular reports to the board of health, and surveillance and monitoring (including some focus on quality assurance at an operational level) was apparent in each PHA. PHA staff regularly participated in professional training that was organized regionally through the TCAN (e.g. related to enforcement of the SFOA, cessation, other topics), or offered by local government departments (e.g. management services, labor relations, computer services departments), and attended team meetings which almost always included information exchange and sometimes involved skill building (e.g. related to enforcement protocol). Communities of practice as defined by Wenger et al. (as

"groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (E. Wenger, McDermott, & Snyder, 2002; p. 4) with defined communities, practice domains, and documentation of learnings did not occur in tobacco control per se at this time in the PHAs. However, professional practice forums were held in two of the PHAs and interdisciplinary forums for knowledge exchange were evident in all three PHAs (e.g. Thursday Skill Building Forums, nursing practice, environmental health team meetings). Informal reflective practice incorporated into management—staff interactions including team meetings was also apparent in all PHAs (also discussed in the following subsection pertaining to organizational learning mechanisms). However, none of the PHAs had a systematic approach to encourage "reflection in action" or to encourage regular "post action reflection" in tobacco control (this was reported to occur post infectious disease outbreaks in one PHA) as part of an expected formal program of reflective practice per se. All PHAs participated in provincially organized PHA accreditation. Only one (Urban PHA) discussed the use of regular chart audits to evaluate the quality of practice (in this instance for tobacco enforcement).

Above all, it was very apparent that programs that were considered to be mandatory or funded 100% under the Smoke-Free Ontario strategy were given great attention and implemented in each PHA. In fact, most of the discussion and the action in tobacco control apparently is directed toward the 100% funded initiatives (e.g. YAAs, SFOA enforcement, high school grants). In only in one of the three PHAs (Urban PHA) was there an attempt to link, through an explicit plan, the tobacco control programs funded 100% under the Smoke-Free Ontario strategy with those funded on a cost-shared basis. Furthermore, in the Urban PHA there was a clear attempt to expand tobacco control efforts as well as link them to chronic disease preventive interventions funded on a cost shared basis (i.e. mandatory programs and services under the HPPA). In the Mixed Urban/Rural PHA, there were concerns expressed that there were inadequate resources to implement comprehensive tobacco control locally in part due to a decision to limit tobacco control programming to 100% funded activities. In the rural PHA, in the midst of a large restructuring exercise, there was some hope however that tobacco cessation

services would be delivered in the context of broad-based "social determinants of health" programming, although program plans did not articulate specifically how this might occur.

In all PHAs, there is a clear recognition of the need to consider evidence and other sources of information in a local context and adapt or contextualize such inputs, adapting information and intervention strategies to local circumstances and making sense of the information inputs in light of local programming. This is certainly the case both with respect to interpreting how to implement provincial policy (e.g. SFOA and Regulation) and programs (e.g. youth action alliances). It was also evident that sharing of information and internal PHA discussions contributed to the development of shared understanding among members of a PHA. Knowledge is developed and based in part on organizational roles that individuals assumed and organizational commitments to courses of action were based, in part, on personal commitments (e.g. in the Mixed Urban/Rural PHA, the 100% smoke-free by-law was seen to be a made possible in part to due the personal commitment of the previous medical officer and the now retired director of environmental health).

Personal identities are associated with career related roles and successes in advancing tobacco control (e.g. manager of tobacco enforcement in the Urban PHA "cut his/her teeth" on enforcing tobacco control by-laws). Organizational roles and responsibilities determine the individuals and groups that tobacco control professionals will interact with (internally and externally, staff, partners and clients).

The engagement of internal and external partners, including coalitions, TCAN members, other neighboring PHAs, is seen as important in all health agencies. External pressure is essential to support political will to advance tobacco control bylaws. Work with coalitions and partners is seen as important to ensure coordination of joint efforts (e.g. public education, advocacy, internal briefings) and advancing more effective community interventions.

There is an apparent "action imperative" in PHAs, to demonstrate action and move away from planning as quickly as possible. This perspective was expressed with some concern in the Urban PHA, as perhaps a sense that planning was less valued than action.

Apparently, all PHAs are well aware of the value of logic models and other mental models and frames of reference. As the MHP requests PHAs to rationalize their programs relative to provincial logic models (prepared by the Ontario Tobacco Research Unit, but distributed by MHP), all managers responsible for programs are knowledgeable about these logic models. In the Urban PHA, strategic plans for the department, chronic disease prevention, and tobacco control were being integrated and rationalized. In the Mixed Urban/Rural PHA, a central division was noted to have popularized logic models; and the Rural PHAs was in the process of reorganizing to develop a flatter organization structure, seen to be consistent with a social determinants of health perspective, and their performance plan would be oriented toward a "balanced score card" approach for setting standards and tracking services.

Organizational roles, as well as the size of the PHA and resources at professionals' disposal, also affect which information is considered to be most salient to them personally. Working knowledge and attention to different sources of information is apparently determined by a mix of personal accountability, the personal interests and frames of reference, practical utility of information and credibility of sources of information.

Various organizational aspects, including organizational changes and developments, structure, capacities/competencies, culture, and potentially other competing public health issues factor into decision-making in PHAs. With respect to organizational changes, the Urban PHA has been undergoing changes for about eight years, following the forced amalgamation of municipalities. The Mixed Urban/Rural PHA, having passed and normalized a very successful 100% smoke-free by-law about seven years ago, lost staff and community momentum over the intervening period. Taking on the provincial resource center role as a partner in the Program Training and Consultation Centre, plus

assuming responsibility for new 100% Smoke-Free Ontario programs, the PHA has created a separate unit with a new manager, who does not have a long history in tobacco control. And the Rural PHA is in the midst of a substantial reorganization and redirection of its program toward an integrated, cross disciplinary approach to address social determinants of health.

Organizational capacities/competencies relate to human resources available – including professionals that can be assigned to specific duties (e.g. Rural PHA has one tobacco inspector) and adequacy of systems (e.g. lack of evaluation resources in all PHAs) affect willingness to take on new and expanding efforts in tobacco control. Funding from MHP on a 100% basis assured a base of activity in all PHAs. Cultural sensitivity, including sensitivity to ethno-cultural, income level, educational attainment level and sexual preference was frequently mentioned as a key concern in need of constant attention and efforts to enhance. All PHAs have multiple mandates. Emergency planning and response (including response to pandemics, SARS, severe weather) is a concern for all PHAs and this affects all staff including those involved in tobacco control. It is also recognized that the public health system is multi-level, including provincial, regional, and local aspects. Due in large part to having inadequate numbers of staff at the provincial level and limited provincial staff experience, the quality of relationships with the field is sometimes lacking and/or strained.

Organizational culture – values, vision and mission, degree of hierarchy/heterarchy, tolerance of error and learning from mistakes, and tolerance of discord (i.e. among community interests, sometimes impacting on PHA ability to advance health oriented policies) – also factors into decision-making and practice. It presents the backdrop against which all activities and work in the PHAs occurs. For example, in the Rural PHA, there is a clear attempt to become a flatter organization and more actively address social determinants of health through interdisciplinary PHU public health work. In the Mixed Urban/rural PHA, there is a clear articulation of values including pursuit of excellence, interest in accountability, evidence-based practice, and equity of access to public health services, among other values. The Urban PHA has adopted six broad

strategic directions and these continually surface in interactions within the PHA and affect program considerations and decisions.

In all PHAs, there is recognition that errors will inevitably occur and that there should be learning from them so that they will not be repeated. In one PHA (Mixed Urban/rural), there is recognition that those who identify or anticipate problems should be recognized for doing so (i.e. such behavior should be rewarded rather than punished).

There is a wide variety of potentially competing issues in public health. Given the history with infectious disease control (e.g. AIDS, SARS, concern about future pandemics), tobacco control staff are aware that acute crises could lead to a curtailing of their work in favor of apparently more urgent demands.

Organizational structures exist for purposes of annual operational and longer term strategic planning. These generate expectations and opportunities to advance evidence-based approaches to tobacco control, as well as their linkage to other public health strategies (e.g. chronic disease prevention). For example, in the Urban PHA, there is an internal cross-line, multidisciplinary planning committee with accountability to a single director responsible for the development of a coherent strategy. In the Rural PHA, there are all staff meetings, and divisional (quadrant) inter-disciplinary meetings. In the Mixed Urban/Rural PHA, there is a senior management group responsible for overall management and direction of the departmental programs, a central division that is responsible for policy, planning and evaluation, and health planners assigned to all programs.

There are also structures that affect learning within each PHA. For example, in the Rural PHA, central discussions occur about which trainings would most benefit staff and collective decisions are made to send staff to particular trainings or conferences. At the time of interviews, three of its staff members were enrolled in Master of Public Health graduate training programs. In the Mixed Urban/Rural PHA, 100% of training costs are covered for work related training, and 50% of costs of professional development

expenses not directly associated with job responsibilities are covered. This is articulated in letters of offer when new staff are hired. There is a professional nursing practice forum and an interdisciplinary skill building forum. Regional government also gives priority to management leadership training and succession planning. The Urban PHA has a leadership development program, funded in part by the Canadian Health Services Research Foundation.

All PHAs exist within the context of the provincial public health system, obviously, and are therefore exposed to similar categories of factors in their organizational environment. These include funding from the MHP and MOHLTC for Smoke-Free Ontario and mandatory programs respectively. They are aware that a Community Action Working Group exists and has various subcommittees. However, there is a sense that the structures at the provincial level are not directly relevant to their work, only indirectly in so far as they affect funding and affect technical assistance and training that is offered regionally and locally. There is a sense that these structures could be much more engaging and there is some frustration at the lack of leadership from the provincial level to engage and learn from the field.

To the contrary, TCANs and their subcommittees are seen to be highly relevant and an important forum for information exchange and sharing of local experience. They are also a hub for training, which presumably affects thinking, if not decision-making and practice by PHAs.

There is apparent frustration about the funding of innovative grants, under which the Rural PHA had applied for and were granted funds, only to have the projects terminated prematurely without adequate time for demonstration and evaluation of them. While not prematurely terminated in the other two PHAs, one might seriously question whether less that two years is an adequate time frame for the program to be conceptualized, implemented, stabilized, and properly evaluated.

Local PHA staff are aware that Health Canada has funded grants and contributions projects locally in the past (e.g. during the Tobacco Demand Reduction Strategy and more recently under the Federal Tobacco Control Program).

Partnerships are also considered with health care sector organizations (e.g. hospitals), tobacco-free councils, universities (particularly as related to evaluation of projects), voluntary sector organizations and other community partners.

Obviously, geography is a reality that can not be ignored. Physical geography, the structure of local government (e.g. two tiered or single tier municipal government), local organizations including cultural organizations, population characteristics (numbers, distribution, density, socio-demographics), and relationships with politicians all affect assessments about what interventions are workable in local circumstances. The personal orientations of local politicians and the nature of the relationships that they wish to maintain/develop with provincial and national levels affects the nature of advocacy positions and approaches that are taken (e.g. politicians involved with business of the Mixed Urban/rural wish to maintain collegial relations with provincial politicians). Personal relationships, particularly in small communities, require politicians to be apprised of developments. For example, when charges are pending under the SFOA (e.g. automatic statutory prohibitions) in the Rural PHA, there is an expectation of dialogue with local politicians in advance. There is no interference. However, it is done as a courtesy so that they are not surprised by news that may later break.

In addition, local interpersonal relations and politics also affect tobacco control decisions and tobacco control practice. For example, in the Rural PHA, the local justice of the peace and local police officials have supported tobacco prosecutions with high fines and back-up as needed respectively.

Practice is also affected by seasonal cycles, funding cycles, routines, and other cycles. For example, in all PHAs, it was understood that enforcement of the SFOA regulation pertaining to food and beverage service patios is essentially an issue for attention in the

spring through the fall of each year. The beginning of the school year signals new activity. National Non-Smoking Week (third full week in January) and World No Tobacco Day may or may not affect tobacco control activity depending on themes. There is a consistent concern that the provincial government issues requests for proposals, local PHAs must scramble to meet deadlines, have to wait for funding commitments and contracts, and then are sometimes prematurely terminated. This was apparently the case with at least some recent proposals funded for innovative grants.

Local PHA staffs are well aware of the new, cutting edge issues (e.g. drifting smoke in multiunit dwellings, smoking on patios, smoking in cars and the home, new forms of tobacco, contraband products etc.). They are also aware that there is interest to learn from the tobacco control example for other strategies (e.g. obesity prevention) and determine the extent to which tobacco control can be appropriately integrated with initiatives to address other public health issues.

Time including tempo, point in time, and era all affect awareness of issues and willingness to take action. For example, local public health in Ontario often refers to milestones in the development of local tobacco control – e.g. pre-by-law, post Tobacco Control Act, Post Smoke-Free Ontario Act. Interpretations of what is possible and appropriate are of course time dependent with public support and experience with restrictive policies increasing over time. Time pressures and the need to make relatively quick decisions, in absence of full information as well as the time to reflect on it and the context of current decisions, affects the quality and type of decisions made (e.g. politicians may which to minimize risk, public health professionals may wish to reduce the risk of disease above other considerations).

To be sure, each PHA was unique, with each PHA having its unique history, experiences, organizations, resources (economic and human), and organizational environments. Nevertheless, each was reportedly committed to the practice of evidence-informed tobacco control (considering a wide array of information and other factors), took advantage of provincially organized training programs and networks, gave priority and

developed their own training/technical assistance programs and took advantage of those offered by local government (and others, such as universities), and was very cognizant of the context within which they operated (including contractual and legal imperatives and resource/funding structures). Each reported engaging in local processes as they needed to make sense of information and evidentiary inputs. These mechanisms included social structures for formal planning, management and supervisory committees, division and unit meeting, project management teams that facilitated consideration of information, interpretation and decision-making within their organizations and sometimes (e.g. with smoke-free coalitions) with external partners.

Professional identities, social relationships and networks, dominant mental models (e.g. logic models and concepts related to tobacco control, chronic disease prevention, environmental health, broader social determinants of health), local knowledge (e.g. experience of PHU staff, local politics), personal styles and orientations (e.g. creative, logical, responsive etc.), and resources for understanding and processing knowledge, and organizational realities (size of establishment, availability of specialized professional staff), cultural values (or at least the relative importance of each), organization development processes (all were in various unique transitions), geography, community and client characteristics and many other factors were unique to PHA/PHU circumstances.

Nonetheless, these PHUs/PHAs all participated in the SFO strategy, which was not mandatory per se, and all were committed to align their efforts with the larger province-wide tobacco control effort. A cynic might interpret this participation in an aligned strategy as due to a legal mandate under the *HPPA* and 100% financial contributions from the Province to cover staffing, training and other operating costs, and well as professional expectations throughout the system that all PHAs would engage actively in the SFO strategy. Undoubtedly, these considerations factored into the decisions of many to actively pursue the acquisition of resources, hire staff and mobilize to implement the coordinator positions, the SFOA enforcement strategy and YAAs and so on. However, in all instances, none of the interviewees received significant role changes that would have

been reflected in greater personal salary. Furthermore, there was additional work load added to their already substantial burden due to grant applications, submission of work plans, and accountability requirements.

Each senior professional interviewed is truly committed to their public health professional responsibilities, takes these very seriously, and views tobacco control to be a priority for their PHA. However, as individuals they vary in their personal commitment to the issue depending on the range of issues that they must attend to, and weigh all factors, through social and psychological processes to determine their personal working priorities, and these determine their strategies to advance tobacco control projects over different time horizons. For realist social theorists like Archer (2000), the causal efficacy of people is not questioned. Citing Bhaskar (Bhaskar, 1998), she notes that realism is "concerned with actions which are practical, not just symbolic: with making (poesis), not just doing (praxis)…" (Archer, 2000; p. 310). To paraphrase Marx, people make history, but not in contexts of their choosing. While this may be a complex process, the *modus vivendi* that emerges for managers in public health must balance personal performance and social considerations, with a range of personal needs (including being able to cope with a range of complex demands on issues, sometimes beyond tobacco control). However, once the final social and psychological calculus is completed, it is clear that evidence and a wide variety of information is considered and factored into tobacco control practice oriented knowledge and decision making. This calculation is a clearly thoughtful, reflective, and social process.

b. Forms of knowledge use in public health agencies. What are the various forms of knowledge use in PHAs? How does use occur in these ways?

As discussed, senior PHA staffs were consistent in reporting that they value evidence, particularly scientific evidence and evidence from evaluative studies to provide an empirically justified basis for credible public health decision-making. This sentiment seems to be normative in public health. In fact, admission of ignorance of scientific knowledge or failure to consult scientific evidence did not occur in any of the interviews.

Presumably, for knowledge-based professionals working in key management and directorship roles, this would not be acceptable professional practice. This issue will be discussed vis-à-vis the limitations of case studies at a single point in time, later in this discussion section.

It was certainly acknowledged that the range of public health issues, of which tobacco control was one (albeit an important concern), as well as matters of urgency could affect decision-makers ability to adequately access and properly consider all sources of information. Furthermore, evidence is seen to be "necessary but not sufficient" to decisions, as a wide range of contextual information must factor into decision-making, whether these are strategic, management or operational decisions.

Should the scientific literature (individual studies or syntheses of them) suggest an effective practice or not, public health professions must still judge the appropriateness and likely fit of the intervention for the settings in which they practice and the populations that they serve, as well as the acceptability of the intervention to the community. Nevertheless, scientific evidence and other information are factored into public health decisions and are particularly important in advance of policy decisions, including those pertaining to smoke-free laws. This is instrumental use of evidence (Amara, Ouimet, & Landry, 2004; Johnson, 1998).

Other forms of information/evidence use are also evident. For example, evidence is used in training and technical assistance programs including knowledge and skill building through continuing professional education. Public health professionals are expected to "keep up on the literature" particularly in areas of specialties and assigned responsibility. Evidence use in these areas is apparently educational in nature (enlightenment use). On occasion, as would be expected, evidence is used to justify intervention continuation (e.g. for minimal and brief clinical smoking cessation counseling by professionals there is a general sense that the "evidence is in") and/or participation in interventions that are mandated by other levels of government (e.g. YAAs or approaches like them have been seen to work in other jurisdictions such as Florida, USA).

In addition, evidence and information from scientific and professional publications is used to develop mental models. These may take the form of program logic models and protocols that guide the implementation of standardized public health practices. This is akin to process use discussed in the evaluation research literature, where evaluators work with clients and the process of engaging clients increases the use of logic models and affects thinking about interventions, before the results of intervention evaluations are known (Forss, Rebein, & Carlsson, 2002; Patton, 1998). Perhaps the Ontario Tobacco Research Unit is having some influence through its work with the PHAs on logic models for the performance indicators monitoring system, although this is only speculative. Certainly though, the requirement to rationalize funding applications relative to macro level SFO logic models has created the need to at least consider how local efforts fit with the overall SFO strategy.

Of course, the use of evidence in each of these forms (i.e. instrumental, educational, symbolic, and process use) occurs in public health in a variety ways. These involve "individual" professional consideration of literature, presentations, professional development courses, technical assistance from knowledge brokers, group/team reflections on new information or practice, shared meaning-making/sense-making activities and consensus building within the PHA and with external partners. Consistent with Nonaka and Takeuchi's concept of knowledge creation and conversion in organizations (Nonaka, 1994; Nonaka & Takeuchi, 1995), public health professionals consider and build knowledge socially through socialization (shared tacit experience), externalization (use of stories, metaphors, metonyms, aphorisms, analogies and other tropes to convey understanding about aspects of experience), combination (synthesis and summary of evidence for consideration), and externalization (i.e. actually making policy decisions, allocating resources, and affecting practice related projects and programs on the basis of knowledge transmitted in the social situation).

It must be stressed however, as stated above, that considerations are complex and involve a wide variety of inputs – not only evidence about what works or might work. For

example, there are political considerations about acceptability to and/or resistance from the community, to unions, and to staff; assignments of responsibility, authorities and complexity of decision-making; current demands and opportunity cost trade-offs given limited resources and demands; normative expectations (e.g. role expectations, action imperative; strategic vision and values); general organizational climate (e.g. related to reorganizations, and sense of possibility or not); past experience; and personal identities, interests and commitments to projects to name a few considerations. An overall assessment and judgments based on needs, potential for impact, and constraints and enablements appear to be critical to advancing projects in evidence-informed tobacco control.

c. Organizational learning mechanisms and other aspects of organization. How do organizational learning mechanisms (OLM) and other aspects of the organization (i.e. context, policy, culture, and psychological aspects) in public health affect access to information, and development, exchange and use of working knowledge by TCCs and others (including use by colleagues, organizational structures)?

OLMs are "structures that enable organizational members to jointly collect, analyze, disseminate, and apply information and knowledge. … They include roles, functions, and procedures that enable organizational members to systematically collect, analyze, store, disseminate, and use information relevant to their own or other members' performance" (Lipshitz, Friedman, & Popper, 2007; p. 16). It is also important to note that what differentiates individual learning from organizational learning is the essentially social nature of organizational learning. "Through interacting in OLMs, individual knowledge and learning are transformed into changes in organizational routines, standard operating procedures, shared beliefs and informal norms" (Lipshitz et al., 2007; p. 27).

Lipshitz et al.(2007) suggest that OLMs be characterized along two dimensions – who learns (i.e. internal or external agents of learning) and the temporal-spatial relation between task performance and the actual act of learning (i.e. off or online). These dichotomous dimension when cross classified, yield four possible classes of OLMs: (i)

after-action reviews, post project reviews, and communities of practice (COPs) (offline/internal OLMs); (ii) online experimentation and online debriefing (online/internal OLMs), (iii) post project assessment units and scenario planning units (offline/external OLMs), and (iv) coaching networks and peer assists (online/external OLMs) (passim pages 28-44). Each of these mechanisms was apparent in the PHAs interviewed and at regional and provincial levels of the SFO strategy.

Team reflections on experience was a commonly practiced OLM in all PHAs, occurring amongst public health nurses, tobacco enforcement personnel, health promoters, and members of project teams on a regular basis. The agenda for after-action reviews varied depending on the team and the recent experiences that occurred. Examples of these are as follows. Post SFOA or by-law enforcement activities, public health inspectors or tobacco enforcement officers would debrief and share experiences. Similarly, public health nursing staff and youth advisors would debrief with colleagues post YAA campaigns and events (e.g. following Youth Summits, post National Non-Smoking Week Activities). TCAN subcommittee meetings pertaining to enforcement, media, or youth action were also reported to anticipate and plan future events as well as assess past performance experiences with a view to learning how future campaigns could benefit from their experiences. Similar discussions were reported to have occurred at the CAWG level, although it was apparent that little filtered back down to the local level from these meetings. Regular meetings within trans-disciplinary groups and divisions, as well as within professional practice networks (e.g. nursing) was also reported as part of the PHA practice patterns. While such meetings were regularly occurring, there was no spontaneously reported standardized format for conducting post-action debriefings reported during interviews. This suggests that such activities are most often informal.

On-line experimentation, or learning on the spot, is a very real aspect of the work of public health professionals. For example, tobacco enforcement officers are expected to have mastered knowledge about detailed statutory and regulatory requirements for SFOA compliance and their role is to encourage businesses and public place proprietors to adhere to these. They use this knowledge in actual inspections of compliance, face-to-

face interactions with owners and proprietors, educational interventions, progressive enforcement (i.e. threatened actions), and escalation to charges under the SFOA and/or *Provincial Offenses Act*. To conduct this service, the tobacco enforcement officers will sometimes take their computers loaded with printed material or educational videos to enforcement locations (e.g. stores, public places). As required, the officers will call supervisors for guidance, particularly in dealing with difficult non-compliance situations. It is anticipated that in the future, handheld wireless devices will enable real time electronic text communication between officers and their management. Current relevant information is accessible on-line through the internet now for all enforcement staff in one of the PHAs interviewed and revised procedures (which are revised on the basis of experience and information from the Ministry and other sources) is readily available as needed.

Off-line/external OLMs also exist. For example, the urban PHA was engaged in a reflection on the overall direction of the tobacco control strategy and rethinking its priorities for goals, objectives, outputs, activities, resource allocation, and organization structure based on experience to date since a previous planning exercise a few years previous. There is also an effort to integrate the overall tobacco control strategy into a comprehensive approach to chronic disease prevention, building on lessons learned from tobacco control. In the Mixed Urban/Rural PHA, health planners were assigned to each program to assist with off-line rethinking of strategy, development of logic models, and evaluation approaches to ensure continuous quality improvement. The rural PHA was engaging all staff in critical reflection and redirection of the PHAs activities into a trans-disciplinary structure. This included the development of performance measures based on a modified balanced score card approach. It was also involved in an accreditation exercise with the Ontario Association on Community Health Accreditation which required reflection on the role and functions, policies and procedures for the management of the PHA.

Online/external OLMs have been designed into the SFO strategy with peer support and coaching networks formed for all programs through the TCANs and supports from

various resource centres funded under the SFO strategy. These include a (i) Program Training and Consultation Centre (PTCC) that supports overall tobacco control organizational developments and training and technical assistance (TAT) on other aspects of tobacco control not covered by other units; (ii) Smoking and Health Action Foundation (SHAF) which provides research, education, and policy analysis support on tobacco control policy including tobacco industry denormalization; (iii) Youth Advocacy Training Initiative (YATI) to train and organize youth action and youth development related tobacco control efforts; (iv) a provincial clearinghouse for program materials (known as the Heather Crowe Clearinghouse and administered in Ottawa by the Canadian Council for Tobacco Control); (v) cessation training related programs (Training Enhancement in Applied Cessation Counseling and Health – TEACH; and Clinical Tobacco Intervention Program – CTI); (vi) a Media Network that supports training, technical assistance and networking on media advocacy; (vii) a center to assist with the organizational of non-governmental organization based coalitions – Ontario Tobacco-Free Network; among others, that support health promotion more generally in Ontario through the Ontario Health Promotion Resource System (cf. www.ohprs.ca). Within one of the PHAs (urban), there is an inter-professional practice manager and committee (and other communities of practice under development), a chief nursing officer, a new focus on supporting leadership development across the PHA and a new staff mentorship program. It was also reported that the urban PHA participates in the Urban Public Health Network (cf. www.uphn.ca) where information is exchanged among medical officers of health and an apparent peer support network has developed.

d. Action systems in local tobacco control and the construction of working knowledge. What are the key action systems in local tobacco control? How are these action systems linked to the construction and use of working knowledge?

As should be expected, the key areas of public health action in tobacco control relate to job related roles and responsibilities. At the local level, this relates to areas of SFO strategy implemented by various professional groups in PHA. These include: (i) overall management, policy and coordination functions, involving directors, managers, policy

analysts and tobacco control coordinators (in the case of the Urban PHA, also including a TCAN coordinator); (ii) tobacco enforcement involving tobacco enforcement officers, public health inspectors, youth test shoppers, managers and directors; (iii) youth action involving youth coordinators and peer leaders (in the case of the Urban PHA, also involving a TCAN youth development specialist), (iv) tobacco prevention and cessation, involving public health nurses, health promoters (other than that implemented through YAAs), including regional and local networking.

As discussed above, the OLMs are functioning in the PHAs. Each of the action systems in local tobacco control, at least within the PHA, are active participants in these internal and external mechanisms established to support professional public health practice in tobacco control.

e. Institutionalization and sustaining tobacco control locally. Do TCCs and other public health professionals attempt to ensure that tobacco control is institutionalized or otherwise sustained in their organization and/or in community and partnership arrangements? (If so, how? What factors influence (i.e. facilitate or constrain) this process?)

For the new and expanded program of tobacco control implemented by PHAs province-wide throughout Ontario, among those interviewed, there did not seem to be any great concern about the institutionalization and sustainability of the strategy. The SFO strategy was seen to be a "high water mark" in the development of tobacco control in Ontario, and the resolve of the government to address tobacco as a leading cause of preventable disease and mortality was not questioned.

However, in all PHAs, given their experience with demonstration projects funded under the strategy, there was some considerable frustration that the projects were prematurely terminated before they could be stabilized and properly evaluated to demonstrate benefits, or not (i.e. "no true test"). Apparently, in the case of at least two of the three

PHAs, there was admitted use of 100% financial contributions to tobacco control under the SFO strategy to displace at least some of the program funded on a cost-shared basis.

It was also noted that initiatives under the SFO strategy would likely be incorporated into future mandatory programs and service guidelines. These were drafted by a government sponsored committee process in advance of the interviews. At the time of writing, the new guidelines had not been released, although they were expected to be released soon following the November 2007 elections.

The tobacco control program is seen by all to have reached a "new level of maturity" and there is "no overt threat to the program". In hiring staff, it was noted that – in spite of progress made to reduce smoking prevalence and exposure to second hand smoke – there is still a substantial public health problem to be addressed. It was suggested that it is now time to increasingly focus on quality assurance, look for new areas for policy development and develop a progressive stance on the issue. Future issues identified include the elimination of smoking on restaurant and bar patios, drifting smoke in shared residential buildings, new forms of tobacco, and reaching priority populations with cessation and preventive interventions.

Furthermore, it was suggested that the YAA had potential for application to other public health issues (e.g. the primary prevention of obesity, substance abuse prevention) and much can be learned and transferred from tobacco control to other public health issues (e.g. long-term social change perspective; multifaceted, multilevel, sustained approach; and the importance of systems thinking). The development of integrated approaches to public health (e.g. integrated chronic disease prevention, healthy development, and addressing the social determinants of health) may be considered, by some, to be a mechanism to institutionalize tobacco control. Sustainability is not apparently a large concern.

f. Additional system-level supports for local tobacco control. What advice do public health professionals have to offer vis-à-vis the support that they should receive from system-level structures (i.e. at regional, provincial, or national levels) to enhance practice within their local public health action systems?

The public health professionals interviewed were, as noted, grateful to finally see provincial government leadership to advance a comprehensive, multilevel, public health lead agency approach to tobacco control. Nevertheless, the implementation of such a large scale intervention is not without its challenges. Table 9 (in the Findings section) identifies additional supports for tobacco control that local public health staff would like to see provided at regional, provincial and national levels. Support is requested with respect to the articulation of vision and leadership and needing to be more actively engaged with colleagues across the province in an active tobacco control movement through a multi-level interactive partnership. Timely, consistent, public health-oriented direction – which has been lacking on occasion in the past – as well as legal support for prosecutions, a tobacco enforcement related information system fully implemented province-wide, greater MHP staff capacity and competency, and more effective communication from MHP were also mentioned. There is interest in clarity about MHP expectations that there will be additional tobacco control programs supported under the HPPA in addition to those supported by 100% SFO strategy funding. Last, but not least, there was a very passionate plea for a public health human resource plan to ensure that public health system capacity in the future is able to meet future requirements. This is true in chronic disease prevention, including tobacco control, as well as other areas of public health (e.g. infectious disease and communicable disease control).

C. Methodological strengths and weaknesses of this study

1. Qualitative interviews. This study was based substantially on intensive semi-structured interviews with TCCs and other public health staff that played key roles in the development of local tobacco control within the local tobacco control action system. The role of the researcher, the actual interview format and content, as well as the relationship

between the interviewer and interviewee (their rapport) all affect the content, amount and quality of the data gathered for this study.

The interviewer (also the investigator, analyst, and author of this study) had considerable experience in tobacco control and public health issues in Ontario before this study commenced. In this case, indeed as in the case of many (and arguably all) scientific investigations/projects, the conceptualization and conduct of studies (as with other projects in life) is determined by investigators' interests and views about the importance of the area and the potential for contribution to the field (cf. Archer about discernment of interest, deliberation and dedication as an emergent human process which may apply to scientific projects – Archer, 2000; pp. 230-241). For this reason and in the interest of honest disclosure, at the outset (i.e. at the stage of proposal defense), the investigator situated the project relative to his own personal history (biography). He described himself as "an agent within the tobacco control movement in Ontario, Canada, and North America" and "a tobacco control insider" and has considerable access to tobacco control environments, including governments". It was also noted (Appendix B) that:

> During his Ph.D. studies, he developed an interest in organizational learning as a mechanism for public health system change. He appreciates the potential role of organizational learning mechanisms (structures) and socio-cultural factors in public health systems to enhance the uptake of evidence to improve the quality of public health practice. He has studied qualitative methods and social theory as he believes that they are important for advancing public health systems research. He has not immersed himself enough in dialectical/linguistic or post-modern literatures to yet understand what authors in these areas might have to offer this field of study (i.e. public health). His thinking has evolved and he is now embracing a critical realist view of science, but his thinking is still evolving. Furthermore, he believes that there is a great need for a clearly articulated and pragmatic theory about how knowledge is developed and applied in real world public health settings.
>
> He approaches this study with assumptions that (a) the public health infrastructure in Ontario is still not sufficiently developed to support effective population-based approaches; (b) in spite of this, there are real examples of evidence-informed public health practice and excellent champions in Ontario's tobacco control strategy who can serve as models; (c) lessons learned from this study will demonstrate to scientists concerned with knowledge exchange the complexity of public health knowledge (and that social change, like knowledge development, occurs through social construction); (d) it will be of practical value in informing

future developments in the public health system in Ontario and elsewhere; (e) studying this issue itself will stimulate important dialogue that will have consequences that are not clear at the outset, but will emerge as the study proceeds; and (f) it is, therefore, worth doing whether he successfully competes his Ph.D. or not.

The investigator believes that his personal experience and past roles may have been part of the reason why he was afforded such good access to the field of tobacco control practitioners in public health during this investigation. This may have also permitted the frank and open dialogue that was apparent in all interviews.

The interviews were very easy to schedule and the interviews were very free ranging, yielding a rich set of interview transcripts (about 16.25 hours and 331 pages) from 11 interviews with 12 public health staff – i.e. medical officers, directors, managers, and other key people in local tobacco control within PHAs. While some of the starting assumptions were verified in this study (i.e. underdeveloped public health infrastructure, existence of champions, and complexity of public health knowledge), others have yet to play out. Specifically, the potential of the study to stimulate dialogue and have important consequences for research, policy and practice have not been fully realized at the time of writing – although the dialogues were just beginning.

From the outset, there was concern about potential demand characteristics. As noted previously, these are pervasive and sometime subtle influences in human interactions in general and social psychological research in particular (Orne, 1962; Orne & Whitehouse, 2000). The extent and nature of these is determined by the particular context of the interactions, and they can not be completely avoided.

To minimize guessing of hypotheses of the study and social desirability of certain responses, the investigator/interviewer informed the interviewees that there are no correct or incorrect responses, stressed the confidentially of interview, and indicated that frank discussion would be needed. It was stressed that the purposes of the study (i.e. contributing to social science, practice and methods) would be best served by a solid, well grounded understanding of what was actually happening in the local PHA and PHU.

Direct, honest, professional responses were encouraged. If there was any demand, it was for honesty and frankness. This was made explicit.

In addition, in consultation with the dissertation advisory committee, it was agreed that the interview format should be as open as possible – starting with three broad questions, with the interviewer actively listening and using his feedback and reflections to guide the interview as much as possible. Moreover, the interview started with general questions about the role/job of the interviewee, people that they work with and why, and a general invitation to tell the interviewer whatever he needed to know in order to understand the role of tobacco control workers in PHAs (see Appendix F for the qualitative interview guide). After these general questions, if answers did not touch on all areas, the interviewer guided discussion using a semi-structured format oriented to the general realist model (Figure 1) and the sensitizing concepts (Table 1).

The PHAs were selected at random from within the three broad classes of PHAs. However, as it happened, the investigator had directly worked with two of the 12 interviewees (one as a colleague earlier in his career and another was a recent employee of the interviewer, i.e. within the past three years) and knew professionally seven others. At the time of interviews, the interviewer was not in a supra-ordinate position to influence the funding or career paths of any of the individuals. The relationships between the interviewer and the interviewees can be characterized as mutually respectful. The interviews were conducted in a confidential manner and they were all very frank. Knowing three quarters of the interviewees somewhat in advance (i.e. nine of 12) may have increased the frankness that was characteristic of each of the interviews. As much as possible, the interviewees were directing the interview themselves, with the interviewer actively engaged in listening. Interviewees felt comfortable, as was obvious from their relaxed demeanor, as well as their openness. Sometimes they corrected the interviewer's own statements (e.g. when errors of understanding were conveyed during active listening), indicating a willingness to fully engage in a dialogue.

In two cases, individuals had not met and did not know the history of the investigator, including his previous involvement in the establishment of Ontario's heart health promotion program, and as lead Ontario Public Service director responsible for revising Ontario's tobacco control legislation, i.e. the SFOA. One interviewee openly criticized the process and some of the content of the SFOA and Regulation, and therefore indirectly criticized the work of the investigator without knowing so. The other discussed the need to integrate tobacco control with heart health but clearly did not know the role of the interview/investigator with respect to either program. The role of the investigator in these developments was not disclosed until after the interviews were completed and the tape was turned off. Therefore, it was not an impediment to open exchange during the interviews.

2. Case study at a single point in time. Data for this study were gathered during May 2007. While the data were gathered at a single point in time, respondents were encouraged to reflect on their experience in tobacco control. As one interviewee noted, the field of tobacco control spans more than forty years and it is mature. Some recalled experiences with tobacco control in local PHAs dating back to the 1980s and others to the 1990s. All interviewees, but two, had experience in tobacco control dating back at least 5 years.

This combined experience and insights into tobacco control practice and factors that influence it is an obvious advantage of this approach. However, this recollection and interpretation of experience (the first hermeneutic, also discussed below vis-à-vis epistemological perspective) may be flawed. Nevertheless, four interviews per case – and looking for consistency of patterns across cases and interviews – provide an opportunity for consistency of reporting of the individuals' experiences within and across PHAs. There was an apparent convergence of views about the tobacco control experience within each PHA and saturation of the categories across cases was evident in the analysis.

Most positivist notions of causation require the establishment of temporal precedence of a cause before an effect. As Cook and Campbell note, the Humean conditions for inferring cause includes temporal precedence, in addition to contingency between presumed cause and effect, as well as constant conjunction (T. D. Cook & Campbell, 1979; p. 10). With Cook and Campbell (1979) and others, the author rejects a strict positivist notion of causation. Nonetheless, there are certainly limitations to cross-sectional, single point in time studies that must be acknowledged. Whether one adopts a strict empiricist positivist notion of deterministic causation requiring constant conjunction, a radical idealist view of interpreting the world as the only valid understanding, or a more moderate view as espoused by scientific realism (discussed below), time is nevertheless an important dimension and a single point in time does not allow one to observe or understand causal notions regardless of epistemological point of view. In fact, Kant has noted that time is an essential concept (transcendentally deduced category, or pure concept of understanding) necessary for knowing reality and understanding causation (cf. Kant, 2004).

It was suggested previously that "working knowledge" operating in public health settings incorporates notions such as the intellectual virtues identified by Aristole (cf. Flyvberg, 2001), social cognitive theory (e.g. Bandura, 2000; Bandura, 2001), and weighing and considering an array of considerations identified by socio-psychological constructs suggested by the Theory of Planned Behavior and Theory of Reasoned Action (Ajzen, 1991; Ajzen, 2002; Ajzen & Fishbein, 2005). Others have criticized these theories of social behavior, suggesting that the concordance between covert psychological constructs (perceived control, attitudes towards behavior, subjective normative components etc.) and self reported behavior is open to interpretation – and certainly may not be causally meaningful. Rather, correlations may be seen to reflect assessments of respondents' attempts to be consistent in light of the position or role that they are assuming (A. J. Cook, Moore, & Steel, 2005). Other interpretations such as "positioning theory" in which individuals in roles orient their behavior, including reporting on it, such that it is consistent are therefore also plausible explanations. Regularities are not of course the same as causal associations. As Archer has suggested, diachronic analytic dualism –

possibly in the form or analytic histories – is necessary to tease out and understand temporal causal influences among such factors and these may indeed be reciprocal (c.f. Archer, 2000; Archer, 2003). Unfortunately while this study has much value, it must be conceded that a longitudinal design, and the analysis that might be enabled by it, is not one of its strengths.

3. Emergence of the grounded theory. The theory developed in this study emerged as a grounded theory which was based substantially on interview data, supported by other sources including field notes, documentation, concepts drawn from literature, and social theoretical notions. However, the method used sought to be theoretically sensitive, to avoid forcing the data, to achieve theoretical saturation (or at least reach a point that could be considered to be theoretically sufficient), and to take a staged approach (drawing deductive, inductive, and retroductive inferences) to first develop and with slight modifications confirm the theory based on literature. This included a review of extant social theory and propositions developed *a priori* that were informed by literature pertaining to knowledge exchange and organizational learning in other contexts.

A grounded theory may be considered to be "a set of well-developed concepts related through statements of relationship, which together constitute an integrated framework that can be used to explain and predict phenomena" (Strauss & Corbin, 1998; p. 15). Substantive theories are generally developed to apply to a particular substantive, or empirical, area of study; whereas, formal theories are considered to be a more conceptual area of sociological inquiry. Both should be grounded in data (Glaser & Strauss, 1967; pp. 33-34).

In this instance, the investigation sought to develop a substantive theory that would contribute to understanding and explanation of evidence-informed tobacco control practice in local public health action systems. No attempt has been made to generalize this theory into a more formal level.

One might argue that this theory could very well evolve to the level of a formal theory (e.g. evidence-informed practice of chronic disease prevention at the local level, evidence-informed practice of public health at the local level more generally, evidence-informed public health practice in other settings such as provincial and national levels, or evidence-informed practice of health promotion by other organizations). Furthermore, given the experience and level of responsibility of the interviewees involved in this study (i.e. beyond tobacco control in many instances), and the fact that examples arising in the interview were sometimes not tobacco control specific, one might be reasonably justified to suggest that this applies more generally to at least chronic disease prevention in local public health settings.

While the investigator believes this to be the case, it is suggested that it is best not to consider the theory a formal (i.e. generalized) theory until additional work is done to saturate the model's categories with further data from other substantive issues, from other levels of analysis (i.e. provincial or local), or other organizations (e.g. voluntary health sector organizations active in tobacco control). However, this substantive theory has been based on an adequate saturation of the categories at least at the branch and sub-branch level, with the specific properties of each being explicated by the associated twigs. Therefore, the investigator is confident that it may be applied across local PHAs. This is explained further.

This study employed theoretical sampling. "Theoretical sampling is the conscious, grounded deductive aspect of the inductive coding, collecting and analyzing. It is grounded deductions, feeding into data for more induction as the growing theory leads the researcher on. … Theoretical sampling yields collection of data to saturation of the categories and their properties as it strikes out anew for theoretical completeness. … Saturation brings dullness and boredom. Theoretical sampling keeps up the motivation to continue on with data collection. … Grounded theory produces a multivariate theory in which all categories and their properties stand in some relations to the others. … data completeness is based only on theoretical completeness not on numbers or on length of interviews or numbers of interviewees. There is no "N", just sampling for saturation and

completeness which yields a well integrated grounded substantive theory with parsimony and scope. … Theoretical sampling results in an ideational sample, not a representative sample. It is about an area of interest, a conceptual about, not a numbered about." (Glaser, 1998; pp. 157-159). The theoretical sampling employed here is both a strength and a weakness of the approach used.

In grounded theory analysis, the categories are saturated when additional theoretical insights about categories and their properties are not forthcoming to the analyst (Charmaz, 2006; p. 113). As noted also by Charmaz (2006, p. 114), Dey (1999; pp. 256-258) challenges the notion of saturation on a couple of grounds. First, grounded theorists generally produce categories through partial rather than exhaustive coding and the use of the term "saturation" is not consistent with stopping short of coding all of the data. The notion of "saturation", when the researcher stops coding short of not coding all of the data, requires reliance on the researcher's conjecture that the properties are indeed saturated (i.e. boredom and no new insights were apparent). Second, how does one know that saturation is not a product of the data that one has ready at hand to analyze? If other data had been available would additional insights not have been possible? For these reasons, Dey (1999, pp. 257) suggest the term theoretical sufficiency is a more appropriate descriptor than theoretical saturation.

As to the first issue, the researcher in this instance is very confident that the data were fully exhausted as the analyst coded as much data possible for each category and subcategory and twig. The coding was very exhaustive – particularly with the construction of the initial codes and this continued through the conceptual ordering and modification of the categories following consideration of the propositions and literature. As to the second issue, this is of course something that can not be answered empirically through this study. In defense of the case selection however, the investigator believes that the PHAs selected from the three categories of PHA yielded a wide range of organizational, environmental and other factors that adds confidence that the theory should apply to the range of PHAs in Ontario. Two PHAs (Urban and Rural PHAs) were

at or very near the extreme ends of the size of organization and population density aspects, whereas one was near or in the mid-range (i.e. Mixed Urban/Rural PHA).

The investigator concedes that while he started with an interest in tobacco control in the PHU more generally, the interviews were conducted with PHA employees who were able to offer information about their perspectives and experiences largely from an internal PHA perspective. Therefore, the substantive theory should be limited to evidence-informed tobacco control within PHAs, not PHUs.

Following Glaser and Strauss (1967), in the future, if another study conducts a similar analysis with additional and different cases or sources of data, this additional analysis will "never destroy a theory (of any generality), they only modify it. A theory's only replacement is a better theory" (p. 28). The investigator is open to modify his model based on future studies, although it now stands as the only grounded theory of evidence-informed tobacco control by local PHAs in Ontario.

Avoidance of forcing of the data was another dominant consideration for the analyst during the coding of categories. Grounded theory has developed out of objectivist (Glaser, 1998; Glaser, 2004) and constructivist or interpretivist traditions (Charmaz, 2006; Strauss & Corbin, 1998).

The original proponents of grounded theory advocated that literature reviews not be completed until after data gathering and analysis were undertaken, so as not to be shackled by previous authors' theories (Glaser & Strauss, 1967). Nevertheless, Strauss and Corbin (1998) acknowledge that bringing professional experience and disciplinary literature to an investigation is the norm. As researchers interested in constructing a grounded theory begin their work with certain empirical interests, the use of sensitizing concepts (i.e. general concepts that frame research interests following the work of Blumer, 1969), can be a useful aid in guiding research, including data gathering (Charmaz, 2006; p. 16).

Charmaz (2006) quotes Dey that "there is a difference between having an open mind and an empty head" (Dey, 1999; p. 251). She is sympathetic to the view that it is best to articulate ones' own views prior to consulting the literature, while recognizing that this may be necessary in certain situations (e.g. grant applications and theses, for example). In such situations where literature has been consulted, "you can let this material lie fallow until after you have developed your categories and analytic relationships between them" (Charmaz, 2006; p. 166).

The investigator reviewed relevant literature as requirements for the completion of the Ph.D. degree, including the completion of two comprehensive papers and examinations on these (Garcia, Unpublished monograph, June 30, 2006; Garcia, Unpublished monograph, March 5, 2006). These literatures informed the development of the sensitizing concepts. The investigator, on the basis of his understanding of the field of tobacco control and the role of local public health professionals in the SFO strategy and the literature, articulated a series of *a priori* descriptive statements that reflect hypothetical propositions about the practice of evidence-informed tobacco control in PHAs. These were not considered until after the initial coding, conceptual ordering of the categories and construction of models was completed.

4. Inference. The approach used to guide the analysis applied several inferential techniques. First, the grounded theory approach to categorical analysis was driven initially by an inductive emergent process in which the data were themselves used to generate categories. However, as discussed by Strauss & Corbin (1998; p. 134), while the categories and relations amongst them evolve from the data, there is a need to conceptualize data, formulate hypotheses, and interpret the data, which is a form of deduction. Glaser (1998) is clear that "The whole notion of inductive vs. deductive studies is an over simplification of the very complex thinking patterns involved in grounded theory. Yes, to be sure grounded theory is an inductive methodology, but there is some deduction in grounded theory. Theoretical sampling is deductive. It is the carefully grounded deduction from an inducted category or hypothesis of where to go next for the data to compare." (p. 43)

To further extend the deductive phase of the analysis, additional sampling made use of the original (hypothetical) *a priori* propositions to determine if there were additional categories which may have been apparent in the data set but not initially induced and deduced in the comparative analysis. This rethinking was also extended to social theories and concepts. As result of these additional deductions, very little was added to the model. The time dimension was further specified and there was an additional distinction made between interpretation and decision-making, which was located on the path to practice.

Last, but not least, there is a need to understand and interpret the mechanisms underlying the range of factors identified empirically in the interview data that may cause change in the tobacco control practice. This is generally referred to as abduction or retroduction (Wuisman, 2005). The suggestion that personal, cultural and social emergent properties may be operating as mechanisms for change (commented on below in discussion of the critical realist perspective in making sense of the data) is such a retroduction. Aristolean virtues and social psychological theories (Ajzen, 1991; Ajzen, 2002; Ajzen & Fishbein, 2005; Bandura, 2000; Bandura, 2001; Flyvbjerg, 2001), including several covert constructs, are suggested to add insights to the grounded analysis and also point to future research possibilities.

5. Credibility of the findings and analysis. Given the range of ontological, epistemological, and methodological perspectives and approaches applied in qualitative research today, it is not surprising that there is a multitude of views about the appropriateness of criteria to be applied to judge the quality of the qualitative research (cf. Lincoln & Guba, 2000). Janesick (2000; p. 392) has reviewed the work of other qualitative researchers and suggests the need to replace the quantitative concepts of validity, reliability, and generalizability with qualitative referents. The issue of credibility is paramount. Others have suggested that the establishment of <u>trustworthiness</u> (defined on the bases of truth value, applicability, consistency, and neutrality) is critical for judging <u>credibility</u> (Lincoln & Guba, 1985). Fairly recently, the British

Government's Chief Social Research Officer has suggested four guiding principles to guide the evaluation of qualitative research (Spencer, Ritchie, Lewis, & Dillon, 2003). This study suggests that "research should be: contributory in advancing wider knowledge or understanding; defensible in design by providing a research strategy which can address the evaluation questions posed; rigourous (sic) in conduct through the systematic and transparent collection, analysis and interpretation of qualitative data; credible in claim through offering well-founded and plausible arguments about the significance of the data" (original actually presented in list form, emphasis in the form of underlining is added; p. 6).

Lincoln and Guba (1985) suggest credibility (e.g. established by prolonged engagement, persistent observation, triangulation, peer/member debriefing, negative case analysis), transferability (i.e. sufficiently well documented that it can be applied in the field), and dependability (as established through methods including replication, auditing) be the criteria for judging research quality and contribution. They also suggest that credibility is dependent on the audience or the consumers of the research.

Barney Glaser, one of the original proponents of grounded theory, suggests four criteria for evaluating grounded theory: (i) fit – does it express the patterns in the data? (ii) workability – does it account for the main concerns of the participants? (iii) relevance – is it important? and (iv) modifiability – is it open for modification if new data are compared to it suggesting a need for adjustment? (Glaser, 1998; pp. 18-19).

There is some debate in the field of qualitative research about the value of audit or decision trails in the establishment of the credibility of qualitative studies. For example, (Cutcliffe & McKenna, 2004) suggest that "fit and grab" rather than documentation of the actual qualitative methodology – procedures and decisions taken along the way – is most important to establish credible findings. It has also been suggested that "the rationale underpinning the need for audit trails reflects, at least in part, positivist concerns and thus can be seen to be addressing claims about lack of control, validity and bias." (p. 129). Furthermore, it has been suggested that not presenting an audit trail does not challenge

the credibility of findings, particularly for expert qualitative researchers (Cutcliffe & McKenna, 2004).

Others, including a leading proponent for the use of audit/decision trails who is actually an existential phenomenologist following philosophical hermeneutic traditions (Koch, 2006), find this idea appealing for expert researchers, but suggests that rules are useful and audit trails that document following them can increase research credibility and trustworthiness of findings (Koch, 2004). Throughout this study, the decision trial has been documented at every turn. Table 10 presents a summary of the methods and decision that summarizes these developments.

The investigator agrees with Lincoln and Guba (1985) and suggests that Glaser's (1998) criteria are applicable given the nature of this study. Given that no absolute truth criteria are possible, the best that can be expected is an attempt by the author to persuade the reader about the credibility of the product. At the end of the day, it will be up to you the reader, among others, to judge the credibility of this study. Humility is essential in the process. The author remains open to criticism and is willing to modify the theory and keep the dialogue going (particularly given the critical realist perspective adopted at the outset and the associated ongoing commitment).

However, it is hoped that (a) the author's experience in the field as an "insider", access to key people and their willingness to share their time and insights, (b) the methods being straightforward and thoroughly documented, (c) the sufficient saturation of categories, including triangulation and therefore convergence across diverse cases (and interviews that were used to construct them), as well as (d) the substantive confirmation of the validity of the case descriptions, conceptual ordering of the categories, models, and the supports need from other levels of the system though member checks, when taken together, establish for the reader the credibility of this study.

It is further hoped that the conceptual categories and models are easily understood and sufficiently documented that they may have *useful* application by technical assistance

practitioners to assist the cases and those conducting further research. The conceptual framework has already been of assistance to the author and colleagues at OTRU in their efforts to conduct a survey of OLMs and cultural factors associated with knowledge exchange and organizational learning across Ontario's 36 PHAs. The categories, developed through a grounded theory process of constant comparison, should be replicable in future studies or may need to be modified to accommodate outliers or negative cases. The data were exhaustively coded and were theoretically sufficient to fully characterize the categories that were apparent in a very rich data set contributed by the time and insight of public health professionals interviewed were very experienced and knowledgeable about the operating factors in their work environments. Further comments about the relevance and contribution of this study are made below.

Table 10: Methods and Decision Trail

Methods / Steps	Brief Description	Decision Trail and Commentary
1. Case identification	• Three broad categories of cases: TCAN/PHRED, Innovative, Other • PHAs selected within each category at random	• Based on public information from alPHa and OTN • Former SFO manager assisted in identification of PHAs winning early YAA competition
2. Initial PHA contact	• Initial contact with medical officer of health • Explanation provided • Communication, followed-up with written confirmation of consent	• Permission requested to confidentially and voluntarily interview key senior staff on work time • All PHAs receptive, provided names of contacts • All contacts receptive and interviews easily scheduled
3. Initial test of interview format	• Reflection on demand characteristics • Documentation of field notes and reflective notes	• Conducted in one PHA (Large Urban PHA) to start • Conducted interviews with four senior staff as described • Demonstrated complete openness, accommodation • Discussion with two committee members and advised to proceed with remainder of interviews
4. Conduct of interviews	• All interviews conducted in private offices or board rooms, following consent and audio recorded • Interviews easily scheduled at mutually convenient times	• Interviews were semi-structured starting in open format • All interviews in May 2007
5. Phase 1 Analysis – Initial coding	• Initial paper and pencil list of 4 interviews to generate initial set of categories	• Generated 77 initial categories potentially needing coding, added to NVivo7 as tree categories

Methods / Steps	Brief Description	Decision Trail and Commentary
	• Review of research questions, model of CMO configurations, and sensitizing concepts • Constant comparison of incidents to categories and combination of some categories • Reduction of number of categories based on coded incidents • Saturation analysis by inspecting incidents of categories in individual interviews and PHA sets	• Initial list extended to 80 categories • Concerns about the number of categories, forcing, and time considerations addressed through constant comparison • Completion of coding using visual inspection and textual queries until exhaustion; yielded 69 codes. Some categories being extraneous to the theory about local PHAs • Final reduction to 58 initial codes for theoretical analysis • Analyst satisfied that additional incidents were not to be found in interview data for "unsaturated" categories
6. Phase 2 Analysis – Integrating and elaborating the categories	• High level categories based on initial realist model categories, plus "interpretation" and "time" to include 5 categories (branches), consideration of sensitizing concepts • Extensive documentation	• Consideration of three additional broad categories, add interpretation and decision-making, drop parts and integrate parts of "knowledge aspects", defer some concepts that were not theory-relevant, appropriately integrate orphan aspects (e.g. cutting edge issues into practice integration, potentially competing issues into organizational aspects) • Table produced to fully expose aspects of branch, sub-branches, and twigs • Narrative description of each of 6 branches, 25 sub-branches, and 93 twigs
7. Phase 3 Analysis – Preliminary theory	• Preliminary model and sub-models developed in graphic form	• Based on analyst's understanding of the textual data, supplemented by observations from the data using comparative methods focusing on relationships amongst categories
8. Phase 4 Analysis – Integration with social theories and reflections on propositions	• Selective review of extant social theories for notions that may be relevant to the theory, to increase theoretical sensitivity • Identification of illustrative quotes • Review of initial propositions stated *a priori*	• Temporal intensity/pace and era aspects added to the sub-branch category structure on the basis of social theory • Concepts and jargon found in *a priori* propositions but not mentioned in interviews were <u>not</u> included in the theory – specifically the concepts of lawsuits against the tobacco companies, freedom of information requests, organizational slack were not included, and terms such as canonical practice, tobacco industry rhetoric, and collective minds were not used in analysis • Noted that interview data went beyond factors identified at outset (e.g. notion of tolerance of discord) • Commitment made to category (6 branch, 27 sub-branch, 98 twigs) structure made before constructing case descriptions on the basis of it
9. Phase 5 Analysis	• Revisited original data	• Model and category structure were

Methods / Steps	Brief Description	Decision Trail and Commentary
– validation and revisions through member checks	(interviews) and reconstructed the cases using the category structure as the framework. • Summary of advice across all PHAs regarding the additional supports/changes that they would like to see was developed • General model, category structure, case descriptions, and additional supports table were sent to tobacco control managers (actually director on one case as manager was absent during original set of interviews) • Telephone calls with three managers were conducted	confirmed in each of the three interviews • Comments made editorially and to some matters of fact in case descriptions • Most discussion focused on provincial and regional supports. Language strengthened in some places (e.g. provincial leadership). • Plans developed to convey information about system level requirements
10. Interpretation / Hermeneutics / Realist Sense-making	• Revisited the research questions set out at the beginning • Discussion of issues	• Role of study was to develop a theory of practice. However, answering questions demonstrates strengths and limits of data source, as well as some differences amongst the cases. • Interested to document awareness and concern for various methodologic and analytic issues including: – demand characteristic; – emergence versus forcing – including letting the original literature review lie fallow, yet increase theoretical sensitivity by reading and considering social theory; – application of different inferential techniques; – documentation; – addressing issues pertaining to credibility and trustworthiness of the study; – ontologic and epistemologic perspective applied in the study; – implications for practice, social theory and methods
11. Encouraging use	• Discussions with MHP, PTCC, TATTG, and others • Presentations at professional meetings • Publications	• Preliminary discussions with MHP, MOHLTC, PTCC. TTATG aware of study. • Considering options to increase use through direction, education and advocacy • To be discussed with committee members subsequent to completion of study

C. Ontological and epistemological perspective

It is difficult, if not impossible, for one who wishes to conduct a social scientific inquiry into aspects of knowledge, knowledge exchange and evidence-based practice to avoid pondering philosophical questions about the nature of the world (ontology) and how we know it (epistemology). This is not a thesis on the philosophy of knowledge. However, the investigator wishes to briefly declare his orientation that provides the foundation for the approach to this study and interpretation of the findings, including the implications of this work and future directions for research, policy and practice. The investigator has, after much thought, adopted a critical realist perspective. This perspective embraces ontological realism, epistemological fallibility, and judgmental rationality.

This orientation is mid way between the poles of positivist empiricism and radical idealism, and is a reasoned position that might be easily embraced even though it is relatively new and not well known in public health circles. As Bhaskar and Lawson (Bhaskar & Lawson, 1998) note, "It is conceivable that most scientists would subscribe to being scientific realists in the sense that they accept that the theoretical terms they employ possess real referents independently of their theorizing" (p. 3). One might agree with the common sense view that there is a real world beyond our own thinking and knowing (mind independent of reality) and this is not a radical departure in science and may very well be the *modus operandi* of most public health practitioners as well. Perhaps this is not a hard sell.

A definition of realism, albeit a rough approximation (and open to some challenges), is that "scientific theories correctly describe the nature of mind-independent reality" (Chakravartty, 2007; p. 27). Critical realism is scientific realism applied in the social sciences. The notion of "critical" social science suggests that action is compelled through understanding. Sayer (1992) states:

> "that social science must stand in a critical as well as an explanatory and interpretive relationship to its object and to common-sense knowledge should not be underestimated. It means more than merely a different way of 'doing social science': it implies a different view of the social role of this type of knowledge

> and for 'intellectuals'. It means that social science should not be seen as developing as stock of knowledge about an object which is external to us, but should develop a critical self awareness in people of subjects and indeed assist in their emancipation. It does this by first remembering that the 'object' includes subjects, that the social world is socially produced and hence only one of many possible human constructions. It encourages emancipation and self-development by denying the reified, nature-like quality of appearances of social life and by bringing to light formerly unrecognized constraints on human action" (pp. 41-42).

In this way, critical social science can be seen as contributing optimism for change. Certainly, this is consistent with views about the importance of researcher-practitioner (including policy-maker and manager) collaboration and indeed is part of the definition of knowledge exchange adopted by prominent organizations in Canada (e.g. Canadian Health Services Research Foundation, National Cancer Institute of Canada).

Beyond compelling action on the basis of knowledge, critical realism offers a number of other key features that may be useful in advancing a science of public health promotion in general and knowledge exchange in particular. Many of these tenets were outlined in "The possibility of naturalism: A philosophical critique of the contemporary human sciences" (Bhaskar, 1998) in which transcendental realism was set out as an under-laborer of research. These are well discussed by Sayer (2000) and are only identified as follows.

First, transitive and intransitive dimensions of knowledge are distinguished, as discussed above. The objects of science or the things that are studied are intransitive (i.e. would exist independent of knowledge of them). Theories, studies, publications and other products of science are transitive, though very much part of the concrete and objective social world (e.g. studies, evidence reviews, libraries, academic and research institutions).

Second, the notion of causation in realism is contra the Humean successionist view (i.e. deterministic constant conjunctions) that requires regularity of patterns of events in which presumed effects always follow in succession from causes. Causes are also seen as inherent in social objects and the mechanisms need not be operating in each and every case. For example, the capacity of individuals or groups to act is not necessarily evoked

in every instance, yet these capacities may be inherent in the individuals. Contextual factors including organizational structures and cultural expectations may influence the exercise of the powers of these capacities.

The role for the realist scientist is to identify the causal mechanisms, how they work, how they are activated and under what conditions. Causes are often thought of as powerful particulars. The powers may be exercised repeatedly, or not at all, and possession of a power is different than exercising it. Powers may be possessed and not employed over time, but may be exercised when the conditions are right (Harre & Madden, 1975; p. 94). Essentially, causes may be seen as a capacity to act, given that possibility when enabled by the proper circumstances. Tobacco control provides a powerful example that change in societal culture and structures are possible, evolve variously in different contexts and times, through sustained and concerted joint actions of people (e.g. smoke-free laws and other policies are advanced by real people, with real passions and commitments, working tirelessly together).

Third, and consistent with this, critical realism's ontology is stratified into the empirical, the actual, and the real – pertaining to experiences, events, and mechanisms. The positivist/empiricist approach is concerned with empirically observed characteristics alone; whereas the interpretive constructivist approach is concerned with symbolically expressed meanings (Wuisman, 2005). Experiences may be sensed and events may also be observed. In this sense, they can be considered empirical. The real is considered to be whatever exists and may go beyond the observable, and there is more to the world than patterns of events. There are underlying mechanisms, which may not be observed, but are nevertheless operating in certain contexts (an example from natural sciences is gravity). As noted above, a particular capacity to act may not be invoked until the circumstances are correct. Social contexts together with socially developed understandings – including about understandings about empirically demonstrated efficacious mechanisms of action and what is acceptable locally – can create opportunities for causally efficacious action by people in public health professional roles.

Fourth, emergence is the notion that a whole can have certain powers that are not found in its parts when isolated. When formed together into a group or other social form (e.g. an organization) the causal parts of the social form arise from the entity's parts and their relations. It is a notion of synergy, catalysis, or creation resulting from the integration of elements into a new and more (or at least differently) powerful whole (cf. Elder-Vass, 2005; Elder-Vass, 2007). New powerful potential particulars therefore may emerge when combined in social forms. The complementary aspects of internal and external organizational factors, as well as the roles and actions of professionals within PHAs, has been documented in this study.

Fifth, with respect to interpretation, Sayer (2000) notes that "Critical realism acknowledges that social phenomena are intrinsically meaningful, and hence meaning is not only externally descriptive of them but constitutive of them. … Meaning has to be understood, it can not be measured or counted, and hence there is always an interpretive or hermeneutic element in social science". The "natural science operates in a single hermeneutic while the social sciences operates in a double hermeneutic. These circles imply a two-way movement, a 'fusing of horizons' of the listener and speaker, researcher and the researched". However, he also notes that "Meanings are related to material circumstances and practical contexts in which communication takes place and to which reference is made. So while we can endorse much of hermeneutics, realism insists (a) on the material commitments and settings of communicative interaction, and (b) on the presence of a non-discursive material dimension of social life" (pp. 17 & 18). As a result, "Realists can happily accept weak social constructionism, while noting that the social character of knowledge does not mean that it cannot successfully identify real objects (including social constructions) which can exist independently of the researcher. Knowledge, though situated, can, in some sense, be objective" (p. 90)[11]. Information,

[11] Crotty suggests that "It would appear useful, then, to reserve the term *constructivism* for epistemological considerations focusing exclusively on the 'the meaning-making activity of the individual mind' and to use the constructionism where the focus includes 'the collective generation [and transmission] of meaning' (Crotty, 1998; p. 58). As such, social constructionism as defined by Crotty could be seen as social process and social science, including critical realism, would be a social construction (albeit to the social realist the social science enterprise and products are real).

scientific syntheses, and "evidence" in whatever form does exist objectively. This study documents that it has been considered by PHA professionals as a basis for their actions.

As noted earlier in this thesis, the logic of realist explanation, according to Pawson and Tilley (1997) is as follows. "The basic task of social inquiry is to explain interesting, puzzling, socially significant regularities. Explanation takes the form of positing some underlying mechanism which generates the regularity and thus consists of propositions about the interplay between structure and agency has constituted the regularity. Within realist investigation there is also investigation of how the workings of such mechanisms are contingent and conditional, and thus only fired in particular local, historical or institutional contexts." (p. 71, acronyms removed).

Given this perspective, it is not unreasonable to also be open to insights from other hermeneutic traditions in order to understand social phenomena. Several have offered insights during the conduct of this study. These include ideas from historical hermeneutic traditions (cf. Gadamer, 2004b; Gadamer, 2004a; Mannheim, 1985 &1936) such as awareness of the importance of history and tradition – as well as the necessity of interpreting experience in light of it (i.e. historically affected consciousness). They also include: the notion that the scope of awareness/consciousness or horizons, the potential for prejudice (i.e. judgment before all is examined), hermeneutics being affected by forethoughts and prior questions, and the *potential* remedial role of "fusion of horizons" or at least the benefit of reflection about situations within which interpretations occur. Furthermore, a distinction between sensible objects (appearances) and reason created entities is also a fair distinction amongst categories – i.e. phenomena and noumena (as beings of thought), and that there may be certain categories which are essential for other understanding (such as space and time but perhaps not the Kantian notion of cause; Kant, 2004) are also useful. Notions of inter-subjective experience and understanding, shared stocks of knowledge, use of signs, sign systems and interpretive schemes from phenomenology (cf. Berger & Luckman, 1966; Schütz, 1932; Schütz, 1954) are also useful and can find their place within a critical realist tradition, provided of course that

they are grounded in reality – as is the case in a grounded theory of evidence-informed tobacco control practice.

About social science as an empirical science, Schütz (1954) has noted that "concepts formed by the social scientist are constructs of the constructs formed in the common-sense thinking by the actors on the social scene … scientific constructs are objective ideal typical constructs and, as such, of a different kind from those developed on the first level of common-sense thinking which they have to supersede. … By making up his mind to become a scientist, the social scientist has replaced his personal biographical situation by … a scientific situation." (p. 270). Therefore, although critical realism would seek to understand the same empirical realities as phenomenologists (i.e. through experience and events), there is also a commitment to understanding reality – including the underlying mechanisms and contextual matters that affect their operation. Interestingly, this is consistent with Schütz' (1954) suggestion to seek understanding by looking beyond experience to "underlying motives and goals." (p. 272). These insights have implications for public health practice, social theory and methods. One may generally argue that there is value in reflecting on the real, while at the same time observing, understanding and practicing tobacco control and thereby trying gaining knowledge of underlying mechanisms through action.

E. Implications of this study for public health practice, social theory, and methods

To the author's knowledge, this investigation represents a first attempt to develop a grounded theory that describes the manifold factors implicated in evidence-informed tobacco control practice in Ontario PHAs. This study and the theory that emerged from this investigation have several implications for public health practice, social theory development and methodology for studies pertaining to knowledge exchange. These are discussed briefly in order. The implications and how they may be addressed are outlined as follows.

1. Implications for practice. With respect to practice, the theory of evidence-informed tobacco control in Ontario public health units will be of interest to those responsible for developing the capacity building program for the SFO strategy. In fact, the member check has already given a preliminary indication that this is the case (e.g. interest in follow-up consultations). This study has begun to be useful in several respects.

First, the investigator is a member of the strategic directions committee for the Program Training and Consultation Centre. This committee provides strategic oversight and guidance to the director, manager and staff of the various partners of the PTCC. Partners include two local health agencies, Cancer Care Ontario, and the Ontario Tobacco Research Unit. In this context, the findings will be discussed with a view to determining how the framework for evidence-informed tobacco control (categories and models) might best be used. It will form a basis for the PTCC staff training so as to ensure that PTCC staff has a full appreciation of the manifold considerations that could affect the uptake and use of their services as technical assistance providers.

Second, PTCC, in partnership with OTRU and the Population Health Research Group (PHR), is also conducting a study of the capacity of staff in local PHAs to implement various aspects of the SFO strategy by surveying public health staff across Ontario in ten broad categories of job function. This study has been commissioned by the MHP in order to inform the development of the overall training and technical assistance program to be delivered by resource centres in Ontario.

At the same time, PHR and OTRU are conducting a second survey of the prevalence of OLMs and various organizational factors in Ontario's 36 PHAs. This organizational level survey is based on Lipshitz et al's multi-facet model of organizational learning (Lipshitz et al., 2007). It will assess the prevalence of various OLMs (surveillance, evaluation, reflective practice, training etc.) existing in PHAs across the province and whether additional support is required to develop this aspect of local public health organizational capacity.

The survey content for both surveys was informed by the preliminary set of analyses conducted for this study. These studies, taken together, will provide valuable information about the baseline capacity of local tobacco control and thereby inform capacity building program development. Moreover, through PTCC, discussions will and have been occurring about whether and how the findings of all of these studies taken together may inform the technical assistance and training plan for the SFO strategy. PTCC will be working with all other resource centres to develop an overall TAT approach for the SFO strategy and this study, with the others, is anticipated to be useful background.

Third, while it was previously understood that the factors associated with evidence-informed practice were complex and nuanced to particular organizations and organization environments, the various specific factors had not been elucidated. Therefore, tobacco control resource system staff (i.e. staffs of organizations responsible for encouraging public health practice in tobacco control that is informed by evidence through training and technical assistance) will be made aware of this study through the TATTG (chaired by PTCC).

It has already been agree that the investigator should make presentations and discuss the implications of the study with this group. This study could increase staff understanding about the complexity of factors contributing to the working knowledge of tobacco control professionals in public health. Therefore, staff may have a greater appreciation of the nature of technical assistance, training and network support required. For example, they will be aware that they need to not only provide information. They should also consider how their clients socially process information through local organizational channels and structures in order to affect practice decisions and actions. This might suggest additional types of practical assistance that could be offered to these local PHA clients (e.g. facilitated sessions, meetings with their colleagues, building support through TCANs and MHP etc.).

The investigator, in his role as Director of Knowledge Exchange and Systems Evaluation, made presentations to his staff, as well as colleagues at PTCC, whom are working on a

joint project. This staffs were engaging TCANs and their members about the potential supports that they will offer to nurture communities of practice in tobacco control across Ontario. This engagement took the form of presentations and facilitated group sessions in each TCAN during January through April 2008. This current study served as background to this consultation and informs the interpretation of the consultation findings.

Fifth, preliminary discussions also suggest that the findings from this study might be used to inform the development of a technical assistance logging system. This system will collect information about problems/issues facing local PHA staff (and perhaps non-governmental organization), as well as TAT support offered. This tool may also assess the current availability and access to various sources of information and evidence within the PHA or TCAN. The grounded theory will likely inform the development of instruments and tools for information gathering. In the future, it is anticipated that PTCC and OTRU staff will assist COPs in convening meetings and teleconferences, engaged in SFO-wide reflective practice and information exchange, documentation of locally developed best practices (including educational resource materials, interventions, and processes [strategies and tactics]), and actively disseminate locally constructed knowledge and products throughout the SFO strategy (i.e. generation and sharing of practice-based knowledge about interventions, useful practices, and lessons learned).

Sixth, at the system level, the main findings have been shared with the Manager and Consultant, Planning and Capacity Building with the MHP, SFO unit. This included the advice offered during the confidential interviews about the suggested system level enhancements. While not all messages were easily received, particularly the suggestions and constructive critical comments about changes to MHP operating style, they were nonetheless grateful to receive this input. The concern expressed about the apparent lack of public health human resources planning was conveyed to the appropriate staff in the Public Health Division of the MOHLTC. There was a positive reception to this information, as it apparently reinforced actions that had already been initiated internally but were not yet made public (details were not reported).

Finally, it is also worth noting that the rural PHA was having difficulty connecting with senior management within the MHP prior to the interviews. The investigator facilitated a dinner meeting of the Executive Director and the Director of Health Promotion and Chronic Disease Prevention during the summer of 2007 and, as a result, the level of interaction between these two players was initially improved as a result. Further interventions will be necessary in the future.

2. Implications for an emerging science of evidence-informed public health practice. This study documents, for the first time, a realistic account of evidence-informed tobacco control practice. No one said that it has to be easy to affect change to reduce public health problems, including controlling tobacco. Simple elegant solutions are not available to resolve such broad scale social problems. However, one might suggest that we are more likely to be able to orchestrate change if we are first successful in organizing our thoughts about what factors are important to affect. This study makes a modest contribution through the identification of these factors and explains their relations.

The data clearly show that scientific evidence is a key aspect of the information inputs to decision-making; and, evidentiary inputs to the social construction of knowledge are important in the local context, but it not the only factor that is considered. Clearly, information alone is not sufficient to change behavior, systems or society. Those involved with knowledge exchange practice and science therefore are encouraged to be open to a wider array of considerations. If the ultimate aim of public health science and knowledge exchange is to affect change and reduce public health problems, one first needs a clear assessment of factors that are operating in practice environments. This study makes its contribution in this area.

Theory development may be intensive or extensive, idiographic or nomothetic, and be seen as reflective of "cases of" some phenomenon or a completely "encased" phenomenon. Clearly, there are different approaches to theory development. At one end of the continuum one might place more particular, situated, and self contained theories

concerned largely with the cases involved, and no others; and, on the other end of the continuum, there would be the more generalizable, less historically, geopolitically and institutionally rooted theory, more concerned with variables than cases, and applicable perhaps to a wider range of issues as a result. Idiographers generally are concerned with particular events, in particular historical places and times, including individual/single/unique facts and processes; whereas those concerned with the development of nomothetic theory are concerned with the discovery of more general laws. Grounded theory methodology is essentially a mixed method – straddling the methodological divide, concerned with the development of a dense complex theory (cf. Dey, 1999; pp. 210-230).

The aim of this study was to develop a theory of evidence-informed tobacco control practice in Ontario PHUs. As discussed above, in the judgment of the investigator, this theory should be considered a substantive theory in this area only, not a more general formal theory of evidence-informed public health practice in other settings. In fact, it should be limited to PHAs per se, rather than PHUs more generally.

As a first study to explicate the myriad considerations in public health decision-making and practice of tobacco control, it certainly makes a contribution to thinking about the complexity and dynamics of social processing of knowledge and how these considerations factor into public health practice. Given that the data were developed from the interview data in diverse PHAs, one might have reasonable confidence to suggest that the findings of this study are relevant to other PHAs across Ontario. This substantive generalization is justified by the data and the theory derived from them (i.e. it fits).

The investigator has not made additional analyses that would warrant a more generalized theory, i.e. consideration of this theory as a formal theory. To make grounded claims that it is a more general and formal theory of evidence-informed decision-making or public health practice (e.g. in public health locally, provincially, inter-provincially [including regional health authorities in other jurisdictions] or nationally, or even with respect to

other public health issues in Ontario PHAs, or non-governmental health charities) would require more data and comparative analysis. However, given the investigators' experience and the generality of the categories generated here, it is suggested that the model may well have more widespread application. Furthermore, it may also be sufficiently broad that it could accommodate additional data and be modified upon subsequent sampling. If this is the case, it might apply to other jurisdictions, levels of analysis or issues, and other types of organizations.

That the categories and models resonate with both the members interviewed for this study and other tobacco control professionals in Ontario consulted to date provides a good indication that the model is credible. Further investigations should determine if it may be considered a credible formal theory of evidence-informed public health practice for other contexts.

Early in this discussion, the limits of the cross sectional study were noted. Without a dynamic design, with repeated observation over time, it is difficult to fully appreciate the relative importance of various factors on different practice decisions and actions. Nor is it possible to understand the interdependence of factors and the emergent nature of personal and social change processes. These emergent changes are, from this study, apparently associated with various combinations of personal capabilities and characteristics (knowledge, commitments, skills, personal interests, confidence), cultural characteristics (e.g. values, practice patterns – such as commitment to inquiry, organizational commitment, social relations), and structural characteristics (e.g. policies, legislation and regulations, social obligations, rights and responsibilities).

As this study applied a grounded theory approach to the analysis of data, the investigator (decidedly) did not apply the approach to analytic dualism suggested by Archer in her morphogenetic/morphostatic theory for people, cultural, and structural changes (Archer, 1995; Archer, 1996; Archer, 2000; Archer, 2003); nor did he apply a differentiated tripartite analysis of person, position, and slots that Bhaskar originally alluded to in his transformational model of social action (Bhaskar, 1998). Nevertheless, now that the data

have spoken for themselves, and the categories of factors have been identified, it may be possible to gain additional insights through the application social realist theory in particular settings. Further research, in the form of participant observation or repeated key informant follow-ups, should explore – through documentation and analysis in the form of discursive narrative histories – the emergent nature and social dynamics of information flows in organizations (e.g. the SECI model) and the role of various organizational learning mechanisms in contributing to learning, capacity building, and social dynamics such that practice changes in organizations. Different types and paths of influence for various kinds of information use (i.e. educational, symbolic, process, and instrumental uses) on practice decisions and actions, as well as the relative importance of various factors, also needs further documentation.

In addition, prevalence surveys (as being conducted for individual role-related tobacco control capacities and organizational characteristics survey) will be useful in understanding the prevalence of the factors that were seen as important to decision-making and practice. Without a random sample, it would not be possible to determine the prevalence of current practices. Quantitative analytic studies should also determine, through predictive modeling, the factors that are associated with a propensity to engage in evidence-informed practice. Intervention studies, for example the introduction and evaluation of OLMs, may also be fruitful and should be considered.

However, given the arguments presented earlier about the importance of understanding the process of social emergence on the basis of powerful particulars affecting mechanisms in certain contexts, analytic narrative studies and mixed methods approaches to studying organizational change should be considered.

3. Implications for methodology. The basic methodology applied in this study is not unique. Grounded theory method has been in application for at least forty years (Glaser & Strauss, 1967). What may be a bit unique is the author's interpretation of Glaser's dictum that "all is data" and the actions that led from it. Glaser suggests that "The briefest of comment to the lengthiest interview, written words in magazines, books,

newspapers, documents, observations, biases of self or others, spurious variables, or whatever else may come the researcher's way in his substantive area of research is data for grounded theory" (Glaser, 1998; p. 8). He also suggests that it is important to "read vociferously in other areas and fields while doing grounded theory in order to keep up (one's) theoretical sensitivity. It keeps the researcher super-sensitive to emergence with no preconception" (pp.73-74).

Given that this has been a study in search of a grounded theory, after reviewing the literature pertaining to knowledge exchange and organizational learning, the literature review was left fallow for many months as suggested by Charmaz (2006). This was relatively easy to do, as the study was conducted over the course of several months (approximately 18 months) while the investigator was a part time student. During this time, the investigator then turned his attention to social theory texts when he was not collecting data, analyzing it and writing the thesis.

As discussed previously, during the analysis phase, the research proceeded through grounded theory development using a largely inductive method with constant comparison of the data to the categories (i.e. some deductive aspect as already discussed). This was followed by a review of the grounded theory in light of extant social theory, which added a few aspects to the time category. This was subsequently followed by a review of the propositions developed as part of the original proposal in order to note consistencies (if any), as well as ascertain whether additional categories should be searched for in the interview data set (deductive aspect). However, the interview data were the substantive basis of theory development and little of additional value was added from the either the prior propositions (i.e. the *a priori* theory) or social theory.

The implication of this for future studies is that it is safe to rely on the data from key informant interviews – and not expect a great deal of additional value to come from the literature in allied or other areas. Information from interviews is rich and complete, permitting the development of complex substantive grounded theory. This is as suggested by Glaser (1998) – "trust grounded theory, it works!" (p. 254). Nevertheless, if

progress in a realistic science of evidence-informed public health is to be advanced, a combination of inductive, deductive, and abductive/retroductive studies should be planned.

During the course of this study, during his job related duties, the investigator attended meetings of the National Advisory Committee of the Canadian Public Health Association's project on chronic disease prevention; meetings about the future of research, education and intervention development in Ontario's public health system renewal; the Knowledge Exchange Working Group of the Canadian Best Practices System being developed by the Public Health Agency of Canada, the Manitoba Knowledge Exchange Network's Advisory Committee; and engaged many colleagues in discussions about similar issues (e.g. creating communities of practice and revisiting best practices in Ontario, and developing funding proposals for Health Canada pertaining to knowledge exchange inter-provincially). Repeatedly, there were inevitable musings about "how to make the cultural shift" toward evidence-informed practice in public health. The investigator takes this to mean that we should be concerned with "how do we intervene to fix the problem?" – implying that perhaps public health professionals don't value adequately the scientific evidence or scientific insights that they should be taking advantage of in order to better address public health issues.

This needs to be contrasted with the field experience and analysis of this study. Could an initial inductive study shed light on this issue? Is there a culture in public health that did not value evidence? Was there a major problem of disinterest in scientific evidence?

While nothing is absolutely certain, nothing could be further from the truth. The people interviewed locally "got it". They understood the value of scientific evidence to their roles as public health professionals, yet their world was so much more complicated than any outsider could grasp before talking to them. They were capable and did talk freely and at great length about a great many more specific factors than was ever imagined at the outset – and they understood the complexity of it all. They were extremely insightful. They were articulate. They understood their public health issues, their mandates, and

their roles in their strategies. They had diagnosed their challenges, understood their real world hard constraints (time, staff, money, legal obligations etc.), what would enable action (people, insights, commitments, social pressures etc.), where organizational, political, community, collegial and professional barriers would get in the way, and so on.

Science factored in to be sure. It was orienting and motivating and each person interviewed expressed professional interest in being effective and implementing the most impactful interventions possible, including targeting those in their community that they believe needed help the most. This was their world, and they knew it well.

This has important implications for research. If we want to advance practice-based evidence, we need to work with public health professionals in their environments – in short, value and generate practice-based evidence in partnerships (cf. also Green, 2006; McDonald & Viehbeck, 2007). Clearly, PHA senior staffs are aware of their contexts and needs. Each of the PHAs had already established working relationships and interests to work with academic researchers in Ontario universities.

If access to practice environments and interest in sustained interactivity for joint public health research and development is an interest, there is reason to believe that academics are likely to be well received by PHAs. Indeed, those who have chosen to work with them – and not just study them – might agree that this is the case. Systems thinking and organizational models are of interest to colleagues in PHA. Many also want to be on the leading cutting edge of public health innovation, practice and learning. They understand the need for research and there is a clear interest to collaborate with academics and others who can assist them in developing strategies to inform their practice through evidence and learning through such collaboration (i.e. systems oriented action research per (National Cancer Institute, 2007).

E. A final remark

The investigator of this study wishes to acknowledge and note his gratitude to the public health professionals that gave so freely of their time, expertise, and insights. Without their cooperation and interest in this study, it clearly would not have been possible.

These professionals were open and honest in their remarks and, in the main; they expressed an overall optimistic attitude toward their work and the possibility of continuous improvement and increasing public health intervention impact. As individuals, they had their identities substantially invested in their professional roles and had good reasons to be proud of their accomplishments. They also reflected on their organizations, and contexts, and indeed were clearly active stewards of them.

To paraphrase Marx, people make their own history, but they do not make it in circumstances of their own choosing, but rather under circumstances that have been transmitted from the past. This is the essence of a critical realist orientation to health promotion practice. These professionals demonstrated their professional integrity and choices to act in concert with their visions, informed by evidence, in spite of the complexities of affecting change. We are being well served by them.

As Dr. Roy Cameron has said: "We are the system. If we align our work we will start to build a prevention system. If we do not align our work, we will not have a system, no matter how much money gets spent" (Chronic Disease Prevention Alliance of Canada, 2007; p. 12). Questions remain to be answered by the academic community. Does it wish to and will it serve public health through active engagement of public health leadership and, in so doing, be a leader in advancing effective population-based public health strategies? If there truly is a shared and acted upon vision about building the integrated approach to knowledge exchange (that is the now becoming common place rhetoric in research circles but is so seldom practiced), scientists will be pleased to find that they have willing interlocutors, co-conspirators, co-actors, co-learners, shared meaning makers, and co-authors in local PHAs ready to engage them in action-oriented research to advance public health.

Sometimes people share ideas and ideas become reasons for action, and these ideas are the causes for change (i.e. synchronic emergent powers; Bhaskar, 1997). Hopefully, by working together to create practiced-based knowledge (working ideas and working knowledge together for more effective practice), the members of public health systems and scientists alike will learn how to be more causally efficacious in affecting positive change for public health within their respective primary spheres of learning and action.

Learning *from* the professionals interviewed, we have reason for optimism. Complex systems changes are possible, can happen, and have occurred. Perhaps grasping what is so obvious will help us to understand deeper aspects of reality that future (empirical and metaphysical) studies will disclose to us. We should not forget why we should be committed to critical social theory, realistic studies and realist science: they may be the key to deeper insights that will be important for the prevention of chronic disease and population health may be enhanced through them. Hopefully, this realistic account of evidence-informed practice will contribute value by furthering shared understanding and joint action.

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Appendix A – Acronyms

AIDS	Acquired Immune Deficiency Syndrome
alPHa	Association of Local Public Health agencies
CAWG	Community Action Working Group
CCO	Cancer Care Ontario
CDP	Chronic Disease Prevention
COP	Community of practice
CMO	Context-mechanism-outcome configuration
CTI	Clinical Tobacco Intervention
KE	Knowledge exchange
FIPIPA	Freedom of Information and Protection of Individual Privacy Act
FTE	Full time equivalent
HPPA	Health Protection and Promotion Act
HPV	Human Papilloma Virus
LHIN	Local Health Integration Network
PERT/CPM	Program Evaluation and Review Technique / Critical Path Method
PHA	Public health agency
PHR	Population Health Research Group, University of Waterloo
PHU	Public health unit
PTCC	Program Training and Technical Assistance Centre
NNSW	National Non-Smoking Week
OLM	Organizational learning mechanism
OTN	Ontario Tobacco-Free Network
OTRU	Ontario Tobacco Research Unit
SARS	Severe Acute Respiratory Syndrome
SECI	Socialization-externalization-combination-internalization
SFO	Smoke-Free Ontario
SFOA	Smoke-Free Ontario Act
SHAF	Smoking and Health Action Foundation
TAT	Training and technical assistance
TB	Tuberculosis
TCAN	Tobacco Control Area Network

TCA	Tobacco Control Act
TCAS	Tobacco control action system
TEACH	Training Enhancement in Applied Cessation Counseling and Health
WNTD	World No Tobacco Day
YAA	Youth Action Alliances
YATI	Youth Advocacy Training Initiative

Appendix B – Situating the project in the personal history of the author

The author of this study, John Garcia, has a reasonably long history of involvement in tobacco control in Ontario.

This includes working on an implementation analysis of a report (Task Force on Smoking, 1982) for the Ontario Council of Health, as senior policy advisory body to the Ontario Minister of Health.

He also worked for the City of Toronto Department of Health, in the mid and late 1980s in a number of capacities including: Coordinator of the Breakaway to Good Health Smoking Prevention Program, and supervisor and coordinator of the Community Health Promotion and Advocacy Section. As coordinator for the Breakaway program, he was one of the first tobacco control coordinators in local public health in Ontario. (This program was funded through a Health Canada grant to Dr. William Shannon and Mrs. Marilyn Bowers. Both Marilyn Bowers and Dr. Elizabeth Lindsay served as a coordinator for the program before Mr. Garcia.)

John Garcia worked on cardiovascular health promotion for the City and the Ontario Ministry of Health. He became director of the Health Promotion Branch in the Ministry of Health and had primary responsibility for developing the original Ontario Tobacco Strategy, including the creation of the Ontario *Tobacco Control Act*, 1994. He also had responsibility for the development of other community-based demonstration programs, strategies and a provincial system of resource centres to support health promotion locally.

He worked for five years in the Washington DC area as director of the Coordinating Center for the American Stop Smoking Intervention Study for Cancer Prevention, an NCI funded multilevel partnership engaging 17 state health departments, voluntary agencies, and professional associations.

On his return to Canada in 1999, he became director of the Prevention Unit in the Division of Preventive Oncology for Cancer Care Ontario from which he was seconded to the Office of the Chief Medical Officer of Health as a special advisor to the Health and Long-Term Care Minister to assist with program and policy development activity. He also assumed a number of voluntary roles, such as participating on the Canadian Tobacco Control Research Initiative's Best Practices Working Group and as President of the Canadian Council for Tobacco Control. At that time, he also served as a member of the Prevention Working Group of the Canadian Strategy for Cancer Control, was a founding member of the Chronic Disease Prevention Alliance of Canada and Ontario Chronic Disease Prevention Alliance, and advised Health Canada during the first year of its Federal Tobacco Control Program. He also spent time on a part time interchange arrangement as a senior policy analyst with Health Canada's Centre for Chronic Disease Prevention and Control.

John Garcia was seconded to the Ontario Government during 2004 and 2005 as the first Director of Chronic Disease Prevention and Health Promotion; and, in this capacity, he was responsible for policy and program developments culminating in the *Smoke-Free Ontario Act* and expansion of the tobacco strategy to a $60/year investment by 2006/07.

He is currently a senior consultant in preventive oncology at Cancer Care Ontario, principle investigator and Director of Knowledge Exchange and Systems Evaluation with the Ontario Tobacco Research Unit, and a member of the Strategic Directions Committee of the Program Training and Consultation Centre. He is a volunteer for the Canadian Cancer Society and Heart and Stroke Foundation of Ontario. He frequently interacts and consults to the Ontario Government and voluntary and professional health organizations – most recently working with his staff and colleagues to consult on the development of a sustainability plan for the tobacco strategy and further development of Ontario's smoking cessation system.

As such, John Garcia has been an agent within the tobacco control movement in Ontario, Canada, and North America. He is a tobacco control "insider" and has considerable access to tobacco control

environments, including governments. His history undoubtedly has affected his views about how change is made in complex systems and the role of working knowledge in tobacco control.

He is a candidate for a Ph.D. in Health Promotion in the Department of Health Studies and Gerontology at the University of Waterloo. During his Ph.D. studies, he developed an interest in organizational learning as a mechanism for public health system change. He appreciates the potential role of organizational learning mechanisms (structures) and socio-cultural factors in public health systems to enhance the uptake of evidence to improve the quality of public health practice. He has studied qualitative methods and social theory as he believes that they are important for advancing public health systems research. He has not immersed himself enough in dialectical/linguistic or post-modern literatures to yet understand what authors in these areas might have to offer this field of study (i.e. public health). His thinking has evolved and he is now embracing a critical realist view of science, but his thinking is still evolving. Furthermore, he believes that there is a great need for a clearly articulated and pragmatic theory about how knowledge is developed and applied in real world public health settings.

He approaches this study with assumptions that (a) the public health infrastructure in Ontario is still not sufficiently developed to support effective population-based approaches; (b) in spite of this, there are real examples of evidence-informed public health practice and excellent champions in Ontario's tobacco control strategy who can serve as models; (c) lessons learned from this study will demonstrate to scientists concerned with knowledge exchange the complexity of public health knowledge (and that social change, like knowledge development, occurs through social construction); (d) it will be of practical value in informing future developments in the public health system in Ontario and elsewhere; (e) studying this issue itself will stimulate important dialogue that will have consequences that are not clear at the outset, but will emerge as the study proceeds; and (f) it is, therefore, worth doing whether he successfully competes his Ph.D. or not.

Appendix C –
Overview of literatures relevant to knowledge exchange and utilization in public health settings.

I. Structure of this review

This review provides a extensive overview of literature, which may be relevant to knowledge exchange (KE) and use in public health settings. First, the significant historical developments in cancer control and cancer control research frameworks over the past three decades are reviewed. Cancer is chosen as it has had the most extensive history of trying to support a program of applied research, development, and dissemination for cancer control, including a major emphasis on tobacco control. There is increasing emphasis on knowledge exchange and this evolution is discussed. Second, knowledge exchange-related terminology as applied in Canadian health care and cancer control is discussed. This review makes clear that increasingly the shift to recognize the importance of closer working relationships between researchers to ensure scientific relevance and application of health research. Third, the findings from several important systematic reviews of KE in health care in general and cancer control in particular are presented, followed by a selective review of knowledge exchange studies in various setting and sectors. This identifies a range of factors associated with uptake and various models potentially relevant to evidence-informed tobacco control in public health. Fourth, key concepts from the field of business pertaining to knowledge management and organizational learning are discussed. This identifies a range of concepts and factors generally not applied in public health knowledge exchange, including organizational learning and factors that affect it. Fifth, a brief review of the extensive literature on utilization of program evaluation is included. This helps to clarify aspects of use by reviewing a range of definitions of evaluation use. It also adding process and social dimensions to the already complex range of factors associated with social science utilization (already identified) and reinforces the need for participative and engaging strategies to increase the use of evaluation research and other forms of evidence. Sixth, and last, the appendix concludes with a short overview of additional theoretical and conceptual considerations. These include the need to select and apply key theoretical and practical models of the emerging science of public health promotion – such as accepted planning frameworks, major theoretical models, social cognitive theory, and a critical realist perspective on the morphogenesis of agents, culture, and structures, and a paradigmatic approach to the social construction of public health knowledge.

II. Cancer Control and Cancer Control Research

Hiatt and Rimer (1999) reviewed the history of developments in cancer control in the United States. They note that cancer rose in prominence as a public health problem during the past century, rising from the eighth to the second leading cause of death by the end of the last century. They also note that the earliest reference to "cancer control" dates to the creation of the American Society for the Control of Cancer in 1913, which later became the American Cancer Society in 1945. Initial formation of this organization resulted from concern about the need for cervical cancer treatment, and initial recommendations that emanated from the organization included a call for cancer registration and analysis of vital statistics, descriptive studies of the distribution of cancer and diet, and for public education about cancer facts.

More recently Best et al. (2003), a group including leading American and Canadian cancer control scientists concerned with cancer control research transfer, have reviewed the historical development of cancer control frameworks in the United States and Canada. They identified four major milestones as follows. The first milestone was in 1982 when the U.S. National Cancer Institute (NCI – the largest of the National Institutes of Health) reviewed its approach to cancer control research and created a Division of Cancer Prevention and Control and defined cancer control as: "the reduction of cancer incidence, morbidity and mortality through an orderly sequence from research on interventions and their impact in defined populations to the broad, systematic application of research results."

Cullen (1986) later described the rationale for the shift as the need to ensure the systematic and rapid application of research results. He noted that until that time, the United States had taken a decade and a half to act on knowledge about the causal link between cancer and smoking and another half decade to

begin to see application of intervention research findings. He also acknowledged the need for research to contribute to the solution as it proceeds to gather new knowledge: "salvitur ambulando, the solution is in the walking—action is necessary".

Greenwald and Cullen's model of five phases of cancer control research (Greenwald & Cullen, 1985) was certainly ground-breaking at the time. It laid out an ordered concept of research progressing though phases of hypothesis development, methods development, controlled intervention trials, studies in defined populations, demonstration projects, and eventually nation-wide application of the findings. Their shared vision led to the establishment of a premier Smoking and Tobacco Control Program that systematically implemented a comprehensive strategy of research and development involving multiple priority (or target) populations, channels (or settings, locations and venues), and providers – which culminated in multiple community intervention trials (COMMIT) and the American Stop Smoking Intervention Trial for Cancer Prevention (ASSIST). The latter provided the conceptual models that were the basis of the comprehensive, multifaceted tobacco control interventions implemented in California, Massachusetts, and Ontario, among other jurisdictions.

The second major milestone in cancer control framework development was reached when the National Cancer Institute of Canada's Advisory Committee on Cancer Control published a report in the Canadian Medical Association Journal. In 1994, the National Cancer Institute of Canada (NCIC) defined cancer control broadly as: "the identification, development, promotion, diffusion and delivery of effective and ethical cancer prevention, screening and care services and programs for individuals and groups, always with their active participation" (Advisory Committee on Cancer Control, 1994).

At that time, NCIC developed and promoted a vision that all cancer control activities (research and practice) should be directed toward the unifying purpose of reducing the burden of cancer. It also determined that to be effective, an integrated cancer control framework should be based on comprehensible language applicable to all involved in cancer control activities, support a range of research activities (fundamental and intervention research, as well as surveillance and monitoring), promote a systematic and disciplined approach to knowledge synthesis and decision-making, and result in program delivery in a manner that reflected societal values (e.g. inter-sectoral decision-making, participatory decision-making for patients and the public, and accountability). In addition, NCIC identified stages of intervention research which were based on phased approach to research and development originally developed to guide thinking about health program development (B. Flay, 1986) and these were complementary to the Greenwald and Cullen model of cancer control (Greenwald & Cullen, 1985). However, ACOCC broadened the model beyond intervention research and fundamental research to include surveillance and monitoring (Advisory Committee on Cancer Control, 1994). Furthermore, the inclusion of a "matrix for intervention research and program delivery" made it clear that a range of a "thematic activity" (i.e. substantive cancer control activities) would be considered a legitimate element of cancer control – i.e. in prevention, screening, diagnosis, treatment, rehabilitation, palliation, other (e.g. supportive care), funding-raising, public education, and advocacy.

The third milestone came with Hiatt and Rimer's review and redirection of the US NCI's cancer control program of research (Hiatt & Rimer, 1999). Hiatt and Rimer (1999) acknowledged the relevance of the NCIC model and updated the NCI definition of cancer control research as follows: "Cancer control research is the conduct of basic and applied research in the behavioral, social, and population sciences, that independently, or in combination with biomedical approaches, reduces cancer risk, incidence, morbidity, and mortality and improves quality of life" (Hiatt & Rimer, 1999)

Best et al. (2003) herald the replacement of the Greenwald and Cullen model (Greenwald & Cullen, 1985) as having positive for a number of reasons, including (a) shifting from the predominant emphasis of the Smoking and Tobacco Control Program in later years on phase IV and V research (i.e. more concerned with large expensive diffusion and demonstration projects than more traditional science) toward more discovery based scientific research; (b) recognizing that research through development and dissemination is not a linear process (although one might argue that this is misrepresentation of the original Greenwald and Cullen phased approach which actually did include feedback and redesign aspects), (c) recognizing a key role of social and behavioral sciences; (d) broadening the range of key outcomes to include for example,

risk conditions through quality of life; and, (e) the benefits of multi-, inter- and trans-disciplinary research in contributing different perspectives, methods, and approaches to address cancer control problems.

Hiatt and Rimer (1999) also acknowledged the need for a partnership approach to cancer control involving federal agencies, voluntary organizations, foundations, professional organizations, learned societies, state and local governments, and health systems. They note that "the basic premise of cancer control requires the "useful application of results" of cancer research" and real population-wide impact depends on it.

The fourth major milestone evolves from the Canadian Strategy for Cancer Control[12] (CSCC), in which a working group built explicitly on the US NCI definition of cancer control research but provides and provides for more explicit articulation of socio-behavioral research. As articulated by Best et al. (2003), in the context of the CSCC: "Sociobehavioural (sic) research covers a wide range of research activities, including behavioural epidemiology, development and testing of theoretical models to understand health behaviour, prediction of risk-relevant behaviours, research to develop and evaluate interventions, evaluation of multifaceted community interventions, research to analyze and evaluate the impact of policy and other environmental measures, *knowledge synthesis and dissemination research*. It has many levels of analysis, include *individual processes, biobehavioural (sic) systems, interpersonal relationships and behaviour, organizational practices and macrosocial (sic) processes*." [emphasis in italics added]

Although not discussed by Best et al. (2003), in the development of the CSCC, the Secretariat for the strategy undertook to develop new definitions of cancer control and refined the original NCIC model and definitions of cancer control. According the CSCC: "Cancer control aims to prevent cancer, cure cancer, and increase survival and quality of life for those who develop cancer, by converting the knowledge gained through research, surveillance and outcome evaluation into strategies and actions" (Canadian Strategy for Cancer Control, April 2005; Prevention Working Group, Canadian Strategy for Cancer Control, January 2002).

The CSCC "analytic framework" (Canadian Strategy for Cancer Control, 1999), the Advisory Committee on Cancer Control of NCIC framework is modified to include feedback loops and acknowledge the importance of foundations/infrastructure to conduct the analysis. It is interesting to note that in this model, there is an arrow depicting the flow from decision-making to implementation (policies and program delivery). However, this is not a focus of study or of feedback into the analytic process, which is unfortunate (potentially tragic) given that it is precisely at this point in the model that the breakdown in critical factors may occur preventing the application of research (i.e. at the point from the research adoption/decision to implementation/use).

The CSCC has stimulated NCIC, Canadian Institutes for Health Research (specifically the Institute for Cancer Research), and Canadian Association of Provincial Cancer Agencies to come together to develop a joint research strategy that will be coordinated across agencies and with future CSCC planning. This is now known as the Canadian Strategy for Cancer Research.

Several new accomplishments have occurred over the past several years on both sides of the border and Best et al. (2003) suggest that "working in parallel, good informal working relationships, creativity of cross-fertilization, and a striking degree of synergy" have been apparent. In spite of differences in the US and Canada, some major gains are being made in tobacco control, increased use of mammography screening, and there have been several major program initiatives have occurred on both sides of the Canada-US border. To mention a few, there have been investments in research into social determinants of cancer by NCI; cohort research including genetic and other biomarker indicators; the comprehensive Canadian Tobacco Control Research Initiative; the US NCI funded Transdisciplinary Tobacco Use

[12] As pointed out by (Grunfeld et al., 2004), the term cancer control was used by the Canadian Strategy in contradistinction to the term "cancer care" which refers solely to health care system activity; whereas, cancer control is population-based and aims to translate cancer control research into benefits for the population as a whole, as opposed to only clinical patient or client groups.

Research Centers and Centers of Excellence in Cancer Communications Research; expanded US cancer surveillance activities; NCIC's Centre for Behavioural Research and Program Evaluation assuming key roles in the development of international and national data systems for smoking cessation and smoking prevention interventions; and, the US NCI supported TRIO initiative to expand surveillance and support local action as well as to expand and promote a website to enable access by researchers and practitioners to scientific evidence related to intervention effectiveness (i.e. Cancer Control PLANET).

Since Best et al's review of the evolution of cancer control research in Canada and United States (Best et al., 2003), there have been continuing dialogues between the NCIC and NCI (US) about the development of common terminology and concepts related to research transfer in cancer control. A working paper has been circulated by NCIC and NCI (US) and consultations among primary care practitioners, oncologists and public health professionals occurred during the summer and fall of 2005 about potential areas of collaboration between the two organizations. This document (National Cancer Institute of Canada, Working Group on Translational Research and Knowledge Integration, June 2005) identifies wide variations in the use of terms as "evidence-based health care", "translational research", "knowledge transfer", among others, as problematic. It also begins to clarify standard definitions and uses for terms. Furthermore, it sets out different models of research transfer (linear, relationship-based, and system-based models), discusses the nature of evidence, and discusses the notion of knowledge integration (i.e. incorporation of knowledge into practices and policies of systems and organizations so as to inform decisions and affecting outcomes). It is likely that the NCIC will take decisions at a board meeting in 2006 about future directions, including definitions that they will use in future planning.

The following section will discuss the various terminologies and models in use in health, including cancer control. A broader range of terms (e.g. knowledge creation, conversion, exploration, and exploitation) will be discussed in the sections that follow pertaining to the business literature.

III. Knowledge Exchange Terminology in Health Care

There are several terms that now appear in common use in health care research. These include but are not limited to translational research, research translation, knowledge translation, knowledge uptake, knowledge utilization, diffusion/dissemination[13], knowledge brokering, knowledge exchange, knowledge mobilization, and knowledge integration. Graham and others have reviewed this terminology recently as well, and include a wider range of terms including research utilization, implementation, dissemination, diffusion, continuing education and continuing professional development (cf. Graham et al., 2006).

Translational research is research that contributes to the "transfer of basic science discoveries into clinical applications ('bench to bedside')" and "also its transfer into effective interventions with measurable outcomes at the population level with active community participation in the process ('bench to trench') (National Cancer Institute of Canada, Working Group on Translational Research and Knowledge Integration, June 2005). Where financial interests are apparent, conflicts of interest may emerge and this has prompted much discussion about this topic particularly when barriers between industry and academics are removed (cf. Parks & Disis, 2004). Research transfer is similarly used to depict the flow of scientific information into application, with or without requirements for further developmental research before application of research findings at the bedside or in the field.

Knowledge translation "is the exchange, synthesis and ethically-sound application of researcher findings within a complex system of relationships among researchers and knowledge users." (Canadian Institutes for Health Research). The NCIC working group notes that "Other common terms, including *knowledge transfer, knowledge exchange* and *dissemination* all refer to similar strategies, but use different words to highlight underlying principles proposed as critical factors" (National Cancer Institute of Canada, Working Group on Translational Research and Knowledge Integration, June 2005). Most commonly however, translation is considered to be predominantly a one way *transfer* from science to practice, and as such it is a unidirectional exchange.

[13] Note these terms have been used in a variety of fields beyond health and health care and are defined and discussed in the section pertaining to health and health care models.

Knowledge exchange is defined by the Canadian Health Services Research Foundation[14] as "collaborative problem-solving between researchers and decision-makers that happens through linkage and exchange." Their view is that "Effective knowledge exchange involves interaction between decision-makers and researchers and results in mutual learning through the process of planning, producing, disseminating, and applying existing or new research in decision-making." (Social Sciences and Humanities Research Council, 2005).

Knowledge brokering is a more specific term used to refer to actions taken within broader strategies of KE (National Cancer Institute of Canada, Working Group on Translational Research and Knowledge Integration, June 2005). "Knowledge brokering links researchers and decision-makers, facilitating their interaction so that they are able to better understand each other's goals and professional culture, influence each other's work, forge new partnerships, and use research-based evidence. Brokering is ultimately about supporting evidence-based decision-making in the organization, management, and delivery of health services." (Social Sciences and Humanities Research Council, 2005).

Knowledge use has been used by Manske and Leithwood (Unpublished manuscript) to refer to the "user's application of new knowledge (or innovation or research), rather than the knowledge producer's action" . They have also developed a conceptual framework that describes interactive processes (social processing – i.e. involvement; and, ongoing contact – i.e. engagement) that involve various characteristics of the source (e.g. credibility) and information (relevance, timelines and content), as well as characteristics of context for use (i.e. organizational, community of practice, and individual) in knowledge utilization. Manske and Leithwood (Unpublished manuscript), like others (Amara et al., 2004), acknowledge that multiple types of use are possible. There are also five different models of knowledge utilization that have been identified in the literature (Denis, Lehoux, & Champagne, 2004). These issues will be discussed later.

Knowledge mobilization is a term being used by the Social Sciences and Humanities Research Council to mean " moving knowledge into active service for the broadest possible common good", with "knowledge being understood to mean any or all of (1) findings from specific social sciences and humanities research, (2) the accumulated knowledge and experience of social sciences and humanities researchers, and (3) the accumulated knowledge and experience of stakeholders concerned with social, cultural, economic and related issues." (Social Sciences and Humanities Research Council, 2005)

Knowledge integration is a new term being that was proposed by the NCIC Working Group (National Cancer Institute of Canada, Working Group on Translational Research and Knowledge Integration, June 2005). It is based on the assumption that organizations, networks, and systems can play a powerful role in affecting evidence-based practice. Knowledge integration is defined as "the effective incorporation of knowledge into practices and policies of systems and organizations so that it informs decisions and affects outcomes" (National Cancer Institute of Canada, Working Group on Translational Research and Knowledge Integration, June 2005).

In this document, as at the Canadian Health Services Research Foundation, the term knowledge exchange is used to reflect the interactive and social nature of knowledge[15]. This will be discussed below in the sections that follow. It is suggested that clarity in the use of terms may well go a long way to clarify ontological and epistemic underpinnings, contribute to consistent use of terms, and thereby clarify understandings and advance evidence-based policy and practice.

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[14] The Canadian Health Services Research Foundation is arguably the preeminent organization in health care knowledge exchange in Canada, with a mission "support evidence-based decision-making in the organization, management and delivery of health services through funding research, building capacity and transferring knowledge."

[15] It is acknowledged that the term *knowledge integration* based on system thinking could very well come to be associated with a broader conception of knowledge to include practice-based knowledge. This is implied but not been made explicit by the NCIC Working Group (e.g. acknowledges tacit knowledge and that the knowledge cycle tightly weaves priorities, culture, and context). If after debate at NCIC, there is broader understanding that policy, practice and research perspectives can and should be integrated, the term knowledge integration is promulgated in Canada, consideration must be given to the use of this term in cancer control. At the this point, organizations such as Cancer Care Ontario have developed their own definitions of knowledge exchange and knowledge brokering based on the CHSRF definitions and tailored to the specific organizational needs to integrate these in the context of the Clinical Accountability Framework and the quality improvement cycle.

IV. Knowledge Exchange in Health and Health Care Environments

This section (Section IV) reviews selectively the literature on KE in health and health care and draws lessons that may apply to the future development of the KE system for cancer control. It begins by reviewing a few Canadian authors' views about the historical development of knowledge transfer in health care; major systematic reviews and studies by Canadians concerning knowledge transfer in clinical practice, policy making, and cancer-related. Comprehensive, population-based cancer control is practiced in multiple settings, including but not limited to cancer clinics. Therefore, a selective review and discussion of lessons from educational, health care (primary care, secondary care/hospital, and addiction settings), workplace, and public health-based – as well as broader concepts from diffusion of innovation – is included here. Section V will discuss knowledge development and organizational learning, based primarily on literature from business. Section VI will discuss the additional theoretical perspectives, including planning frameworks, major theories, and the construction of knowledge.

Historical developments. Recently, Shojania and Grimshaw (2005) reviewed the state of science in the area of evidence-based quality improvement (i.e. efforts to close the gap between clinical practice and research) and provided an interesting and informative discussion of historical developments in the field. They characterized developments as evolving through four overlapping phases, each with its own optimistic version of "If you build it, they will come". This was based on a similar phased evolutionary model developed by Naylor to characterize the development of evidence-based medicine (Naylor, 2002). Shojania and Grimshaw (2005) describe the developments as follows:

- *Passive diffusion ("If you publish it, they will come")* – assumption that practice would follow from the development of new research and the only impediments were the flow, volume and quality of scientific evidence. Interventions involved the promotion of systematic reading and critical appraisal skills.
- *Guidelines and systematic reviews ("If you read it for them, they will come")* – the systematic review, evaluation, and identification of implications and recommendations were to overcome the barriers to timely and reliable uptake of a body of evidence.
- *Industrial-style quality improvement (If you TQM/CQI it, they will come")* – the more active introduction of new evidence through the "plan-do-study-act" cycles of total quality management; and these types of interventions are often evaluated through case methods (as in other industries) and therefore the evidence is considered only hypothesis generating rather than confirmatory in nature.
- *Systems reengineering ("if you completely rebuild it, they will come")* – this is considered to be the fourth and current phase of development that suggests radical redesign rather than incremental changes in order to pursue goals in the face of organizational and historical challenges, often involving a major information technology element.

One might suggest that as cancer control is an aspect of health care, and cancer control – including tobacco control – would parallel many aspects of the general health system development, it should be expected that cancer control knowledge exchange (for total quality system quality improvement) would proceed along the same lines. Given the development of more socially based approaches to knowledge exchange in recent years, one might suggest that there could be a fifth phase of development as follows:

- *Social constructionism ("if you invite them along, work with them, they will arrive with you")* – this might be considered a fifth phase of development, given the shift toward increasing researcher/policy-maker/practitioner interaction and knowledge integration, as well as a focus on participative approaches to evaluative research as methods to increase use of findings and the utility of the process.

Knowledge exchange at the practice level. With respect to the evidence accumulated over this period this period of development, the first major review of professional practice directed interventions (Oxman, Thomson, Davis, & Haynes, 1995) was based on a review of literature pertaining educational interventions in the period 1970 to 1993 (102 trials in all). Oxman et al. (1995) identified interventions such as conferences, outreach visits, opinion leaders, audit and feedback, and reminder systems and looked for impacts in terms of general patient management, preventive services delivery, prescribing behavior,

treatment of specific conditions (e.g. diabetes and hypertension), diagnostic service and hospital utilization. As might be expected, they found that dissemination only strategies (e.g. conferences, mailed material) rarely demonstrated effects and more complex, active interventions and multi-faceted strategies ranged in impact from ineffective to highly effective, with most being in the mid-range of effect, reducing inappropriate practice in the range 20 to 50%. Oxman et al.(1995) concluded that there are "no magic bullets" but was optimistic that, with the wide range of interventions available and possible, important changes in practice and patient would be possible if educational interventions were appropriately applied.

Bero et al. (1998), in their review of eighteen systematic reviews to improve professional performance and/or outcomes, classified reviews as focusing on broad-based dissemination strategies, continuing education, particular strategies (including auditing/feedback, computerized systems, and multifaceted interventions), particular target/participant groups (e.g. primary health care professionals), or behaviours (e.g. diagnostic testing, prescribing, preventive interventions etc.) . They note that there were no systematic reviews published before 1988. Most reviews identified modest gains, with passive interventions generally being ineffective; computerized decision support systems affecting some practice patterns (drug dosage, preventive care, general clinical management) but not others (specifically in diagnosis); educational outreach improved prescribing; and multifaceted interventions (two or more strategies in combination, e.g. audit and feedback, reminders, local consensus process, or marketing) seem to be more effective than single interventions.

Grimshaw and others (Grimshaw & Eccles, 2004; Grimshaw et al., 2004) have also reported on the findings of a synthesis of 235 studies of guideline dissemination and observed the following: a median 10% improvement noticed across studies, suggesting that change in practice is possible; most strategies resulted in small to moderate improvements; but, unlike other reviews, multifaceted interventions did not demonstrate greater impact. However, Grimshaw and others (Grimshaw & Eccles, 2004; Grimshaw et al., 2004; Shojania & Grimshaw, 2005) note that their interpretations of the findings are hampered by a lack of a robust theoretical understanding of organizational and provider behavior. They also suggest that "We need empirically derived models to inform the decision to select specific implementation strategies, based on clinical features of the quality target, organizational or social context, and relevant attitudes and beliefs of providers and patients" (Shojania & Grimshaw, 2005). "We need to consider educational, behavioural, social and organizational theories relevant to [sic] four levels", which are "the individual health professional; health care groups or teams; organizations providing healthcare; and the larger healthcare system or environment in which individuals are embedded" (Grimshaw & Eccles, 2004).

Naylor reminds us that while it takes time to introduce evaluate new technology and change management into systems. He suggests we should not be discouraged by modest results, and be heartened by the fact that the medical profession is not impervious to evidence (Naylor, 2002).

Knowledge transfer in health care at the policy level. Lavis et al. (2004) addressed three fundamental questions that must be considered by public policymakers in low- and middle-income countries as they struggle to improve health and reduce inequalities in health. These are relevant considerations for cancer control in Canadian jurisdictions. The questions are labeled these first, second and third order questions, given that the complexity of the investigations and answers proceeds from one to the next. The questions are: "(1) what are the best solutions to the most burdensome health problems; (2) what are the best ways to fit these solutions into complex and often overstretched and under resourced health systems; and (3) what are the best ways to bring about the desired changes in the health systems?" They note that for policymakers, systematic reviews are very useful as they can reduce bias in interpretation of evidence by being clear about research questions, methods of selection and appraisal, summarizing and interpreting the findings in a transparent manner, and can be used to develop a substantiated case for policy in the face of stakeholder pressure when evidence is not sound.

They note however that insufficient high quality work has been done to address policy questions at the health system level and systematic reviews are generally unavailable to address second and third order questions. A similar dilemma has been pointed out by Glasgow et al. (Glasgow, Klesges, Dzewaltowski, Bull, & Estabrooks, 2004), to be discussed below. They are able to offer only a set of questions that

policymakers could ponder when considering policy options in specific contexts (i.e. related to "could it work", "will it work", and "is it worth it"? in specific decision contexts).

Lavis et al. (2003) have provided an organizing framework that they suggest is useful guide research knowledge transfer efforts directed toward policy makers, and justify these on the basis of their understanding of the field. It is based on five questions as follows: "What should be transferred to decision-makers (the message)? To whom should research knowledge be transferred (the target audience)? By whom should research knowledge be transferred (the messenger)? How should research knowledge be transferred (the knowledge-transfer processes and supporting communication infrastructure)? With what effect should research knowledge be transferred (evaluation)?" [16] They advise that clarity of message, being actionable and reviews being presented as "ideas" rather than "data" is more likely to influence decision-making. Furthermore, understanding decision contexts and decision-makers needs is important and often requires time and resources to ensure that information/knowledge needs are met and messages are fine tuned. Credibility of source and roles of knowledge brokers are discussed, as is the importance of active engagement and interaction, ideally at all stages of the research process, and the benefits of two-way exchange over an extend periods to influence cultural shifts in the practice of science and decision-making. They suggest that communication information technologies (such as web sites and newsletters) are important also but should be used to augment, not replace, interactive efforts. Last but not least, they suggest that it is important to measure how knowledge is used rather than simply whether research knowledge is used. They acknowledge that it may be used in many ways, instrumentally (actually taking a decision or action based on it), conceptually (i.e. enlightenment, knowledge, belief and attitudinal change) and symbolically (sometimes referred to as political use; to justify decisions or inaction).

Using this framework, Lavis et al. (2003) surveyed 265 directors of applied research organizations in health and economic/social research. They noted that few research organizations invest in enhancing their internal capacity for knowledge transfer (e.g. by skill building among knowledge transfer staff, understanding effective approaches, or ensuring that their own staff are meeting expectations of clients). However, many do now employ staff with such responsibilities, almost all have websites (although the majority are passive and few have focused/dedicated entry points for key targets), and few (one in ten) evaluate their knowledge translation activities. Areas where improvements could be made are therefore obvious.

More recently, Lavis led a team of Canadian and United Kingdom investigators (Lavis et al., 2005) to systematically review studies (17 studies) of health care manager and policy-maker decision-making, conducted semi-structured interviews with small sample of individuals in top level decision-making roles in health departments and political offices, and reviewed websites (documents produced since 2000 only) of a purposeful sample of research funders, research producers and purveyors, and journals in both countries. Converging the findings from the survey of managers and policy makers together, Lavis and al summarize their findings as follows:

- "Interactions between researchers and health care policy-makers increased the prospects for research use by policy-makers;
- Timing and timeliness increased (and poor timing or lack of timeliness decreased) the prospects for research use by policy-makers;
- Policy-makers negative attitudes towards research evidence decreased the prospects for research use by policy-makers;
- Policy-makers lack of skills and expertise decreased the prospects for research use by policy-makers;
- Policy networks, conflicts and rivalries and trust increased the prospects for use by policy-makers, while lack of perceived relevance, use of jargon, and only publishing for a scholarly audience decreased the prospects for research use by policy-makers; and
- Relationships with or involvement of health care staff in the research process increase the prospects for research use by managers, whereas the (lack of) support of the management and front-line staff who had influence in the area where change was required decreased the prospects for research use by managers." (Lavis et al., 2005)

[16] Lavis et al's advisory group and those consulted in the preparation of this article is an impressive group of experienced applied scientists and decision-makers.

The findings of the key informant interviews were similarly illuminating. They demonstrated that senior managers are generally not specialists, but are rather expert generalists that work in relatively flat organizations with focused mandates and political policy-makers rely on them for advice that emerges through the processes and structure of government. Many factors, other than research evidence, such as finances, competition, strategic fit, legal issues, stakeholder pressures and public opinion all bear on decisions. The study respondents assumed that the policy-making apparatus in government is taking all factors into consideration and providing informed advice. In considering research evidence, generally policy-makers and managers assumed researcher credibility – particularly if they knew each other and if the funder of the research was disinterested and the source of funding was unbiased. Local applicability of findings was a key consideration, prompting a process of reflection and consideration. In considering potential innovations in systematic reviews, decision-makers were open to receiving information about costs, benefits and harms; information about uncertainty associated with estimates; and, information about variation by subgroup in the various estimates. However, there was considerable variation in views about the appropriateness of researchers making recommendations – as research evidence is important but not sufficient grounds for making decisions in policy-contexts. Additionally, almost all decision-makers indicated that reports presenting research evidence in a 1- page take home message, 3-page executive summary, and 25-page report format would be useful. This would increase the likelihood of use by providing formats suitable for different audiences.[17]

These findings are consistent with those of Elliott and Popay (2000) who conducted a literature review, key informant interviews and document analysis to investigate the policy-making process in the local United Kingdom National Health Service. Their main conclusions are that: (1) broad factors, including financial constraints and decision-maker experience, have important – perhaps more important – contributions to decisions than research; (2) research may have indirect effects including shaping policy debate and mediation of dialogue with constituents; and (3) sustained interaction of researchers and users of research increases the chance of research use.

As researcher/user interaction is often considered an important factor in research knowledge use, Harries et al. (1999) have studied the role of the research commissioning process in and by local National Health Service policy-makers which grew out the experience of a public health research centre in north west England. Through interviews and document analysis in one local delivery trust, the investigators identified several factors associated with local research commission and subsequent research use. These included: organizational change and turbulence (chaos, flux) creating opportunities for radical change; individuals exerting influence and commitment to change and using research as a tool to pursue it; resourcing/investments being possible on the basis of resource (funding, staffing, time and timing, access to data) availability; quick turnaround of studies (6 months to a year); recognition that research may actually contribute to the change process and therefore be an appropriate investment; and the development of appropriate relationships including the questioning and independent role of researchers and the establishment of trust relationships between uses and researchers (Harries et al., 1999).

Knowledge transfer and decision-making in cancer control. A systematic review of studies of the diffusion/dissemination of selected cancer control interventions was recently conducted for the US Agency for Health Care Quality and the US National Cancer Institute (Ellis et al., 2003; Ellis et al., 2005). Ellis et al. (2005) reviewed dissemination/diffusion research (including primary studies since 1980 and systematic reviews since 1990) focusing on cancer control interventions[18] in five topic areas including smoking cessation, healthy diet, mammography, cervical cancer screening, and the control of cancer pain. In

[17] The review of websites by Lavis et al. (2005) found that most presented literature reviews and half had systematic reviews; engagement of managers and policy-makers was rare (only 9% of websites, 3 of 4 were research funders); almost all (94%) highlighted implications, recommendations and/or actionable messages, but less than half had one or more reports that actually provided descriptions of possible actions; less than half of the websites provided summaries and about a third provided one or reports with executive summaries – yet a substantial proportion (73%) provided unstructured summaries.

[18] In this review, cancer control interventions were defined as those that promote delivery by providers or the uptake of cancer control behaviours by individuals.

reviewing the findings presented in their review, one is struck by the large number of primary articles identified (more than 6000) with only 56 papers retrieved for screening and data extracted from 30 studies; and for reviews – 5000 titles and abstracts identified, retrieving 32 papers and extracting data from 41 reviews. Clearly, much has been written and much has been systematically excluded in this study. Furthermore, given the small number of studies included overall, differences across study designs, outcomes measured, quality of methods, and completeness of data reporting, a meta-analysis was not completed.

Ellis et al. (2005) conclude that from their review of intervention research (primary studies that includes patient and public direct interventions) that "no single intervention was found to be effective across the cancer continuum" and yet several interventions – such as office system reminders and prompts, health care provider advice, removing financial barriers, and multi-component interventions appear to be effective for several topics. Interventions that appeared to be effective in more than one area include the following: individual/patient reminders and invitations, telephone counseling and individual counseling, patient education, removal of access barriers, media campaigns, and social networks. Interventions that lack evidence include incentives and competitions, and audit and feedback. They also suggest that excise taxes on tobacco also reduced consumption. One might criticize this aspect of this review as needlessly focusing on direct intervention research, as opposed to research transfer per se. With respect to the findings of strategies to disseminate cancer control interventions, they conclude that there is no strong evidence to recommend any one dissemination strategy. They provide a useful table summarizing their findings and advise that there is a need for more research into the dissemination of cancer control interventions. In discussing the challenges of conducting this review, Ellis et al. (2005) acknowledge that there has been considerable research done in the areas of smoking cessation and mammography, yet the evidence on dissemination of interventions is sparse. The inconsistent use of terminology, differences in design, and incomplete information on barriers to dissemination and the importance of contextual factors all contributed to difficulties in conducting the study and interpreting the findings.

Evans et al. (2002) have described a success story in the use of an evidence-based guidelines process which applies systematic literature reviews to identify current best practice evidence and advice on best practices to treat patients in specific clinical situations. Evans et al. (2002) describe how Cancer Care Ontario developed guideline for Paclitaxel application for patients with metastatic breast cancer and Stage III and IV ovarian cancer; proposed to the Government of Ontario that the drug be covered for specific indications; and the Government decision to support a managed systemic therapy program based on evidence-based guidelines.

A policy advisory committee has been struck with cancer centre oncologists, community oncologists, as well as a nurse, a pharmacist, an epidemiologist, and representatives from the community, Ontario Hospital Association, an ethicist, a practice guideline representative and a Ministry of Health and Long-term Care representative. This committee considered the need for new guideline development and made recommendations on the basis of evidence and the values of the group. Efficacy, safety and quality of life considerations all factor into recommendations for new program funding.

Dobrow et al. (2004) have developed a conceptual framework for context-based evidence-based decision-making. They follow Black's lead (Black, 2001) that evidence-based decision-making in policy is qualitatively different than clinical settings, as decision-making changes when shifting from the individual to the population level. Decisions and decision-makers are subject to scrutiny as they affect more people, which increase the need for explicit justification of decisions. The model proposed takes into consideration internal and external decision-making contexts. *Internal context* is the context within the decision is taken and includes such factors as purpose, role of participants in the decision, and process used to arrive at it. The internal context not only defines purpose but the constraints within which decisions can be taken (i.e. contextual boundaries). Decision-making processes can determine background preparation, evidence input, types of people involved in the process and nature of their involvement, requirements for interaction, and the support structure surrounding the decision-making process. *External context* has to do with aspects of the environment in which the decision will be applied and is comprised of factors that are externally fixed such as political factors, extra-jurisdictional factors, and disease-specific factors. Extra-jurisdictional factors pertain to how similar issues and policies are operating in other jurisdictions (e.g. can a colorectal

cancer screening program be observed working well in another jurisdiction, and/or are there feasibility/implementation issues that might arise when applying the policy in the current context). Disease-specific factors pertain to such things as age-distributions and burdens of diseases in the population, ability of the health care system to diagnose, treat and care for people affected by a implementation of a policy. Political factors have to do with a range of ideological, social, economic and legal issues – such a public/private mix, centralization/decentralization, role of government and its agencies, social acceptability of tests (e.g. fecal occult blood testing) etc. Dobrow et al. (2001) advocate a move toward considering evidence utilization, rather than research and knowledge utilization. They suggest this for the following reason:

> "This distinction is important when considering 'evidence utilization' as it marks a progression from a rather narrow focus on the utilization of scientific research, to a broader focus on the utilization of knowledge, to a unrestrained focus on the utilization of scientifically and non-scientifically produced information and knowledge in support of a decision."

Not only do they suggest a broader view of inputs to decisions, they also suggest that decision-making not be considered simply an outcome, but rather as a process. This process follows from Rich's suggestion (Rich, 1997) regarding the processing of information in decision-making. Dobrow et al. (2004) referred to these phases as (1) introduction of evidence; (2) interpretation of evidence, and (3) application of evidence (Dobrow et al., 2004). External and internal contextual factors are thought to impact on the process differentially at each stage – and as one moves from the type 1 (can it work), through type 2 (should we do it here), to type 3 considerations, the nature of the evidence shifts from internal to external validity considerations.

A group of experts in knowledge exchange in cancer control in Canada, led by Eva Grunfeld recently succinctly summarized the current status of knowledge about knowledge transfer in cancer control as follows: "… no one intervention strategy works and no one theoretical model is fully explanatory or predictive; rather, successful translation requires multi-faceted strategies with different theoretical underpinnings depending on the characteristics of the environment, the innovation, and the potential adopters. Knowledge translation was originally seen as a linear process – if research findings were available, it was assumed that they would be read or used. However, recent literature suggests that the process is complex, interactive, and reliant on the user's knowledge, beliefs and experiences. Several models or frameworks of knowledge translation have been presented; most identify similar elements, and no one model has been generally accepted as superior." (Grunfeld et al., 2004)

The following section discusses lessons from applications and research in various settings relevant to cancer control, as cancer control must be practiced in educational, health care, workplace, addictions, public health, and a wide variety of government settings, among others.

Lessons from various settings/systems

Schools/educational settings. Parcel et al. (1995) have productively applied diffusion of innovation theory (Rogers, 1983) to define a four phased strategy for wide-spread diffusion of an effective smoking prevention intervention in school districts in Texas. The Smart Choices Diffusion study four phases were: dissemination, adoption, implementation and maintenance. The dissemination phase was designed to raise awareness, and the adoption phase was designed to affect the decision by schools to actually adopt the program. Newsletters, modeling (photographs, stories, and quotes involving school district personnel), incentives (low program costs, free teacher training, social incentives such as coverage in newsletters) and attributes of the innovation (relative advantage, compatibility, and complexity – actually described as the intervention as a finely tune and complete program requiring no additional resources or preparation) were used to market the program to school district personnel. School districts were assigned to intervention and comparison conditions, and independent effects of the intervention, organization, teacher, and administrator variables were assessed – taking into consideration the fact that school districts were not randomized in the study design. Characteristics of schools (size, expenditures/student, percent college bound, minority percentage) and administrator and teacher attitudes and beliefs (e.g. outcome and efficacy expectations) about the policy, program, and personal characteristics (innovativeness of teachers) were assessed. The

odds of adoption in the intervention district was assessed to be 9.46 higher than the comparison district after taking into consideration other factors that were entered into a step-wise logistic regression sequentially (relative advantage, teacher attitudes toward tobacco policies, ethnic composition, teacher attitude toward tobacco prevention were all important predictors entered before the intervention variable). Diffusion theory and social cognitive theory provided useful organizing heuristics (Bandura, 1986).

Health care – primary care settings. In a series of three papers developed by Rushmer et al. (Rushmer, Kelly, Lough, Wilkinson, & Davies, 2004a; Rushmer, Kelly, Lough, Wilkinson, & Davies, 2004b) the notion of "learning practice" in primary care is well introduced. These papers draw on theoretical concepts and empirical research about learning organizations identifies the benefits to the organization in terms of operating more effectively and smoothly and suggests pitfalls and practical difficulties in moving to this direction (e.g. role definitions, political behavior, difficulties in tolerating errors). Several important concepts from the business and organizational development literature as laid out: such as single-, double-, and triple-loop learning; types of learning (e.g. about things, to do things, to become ourselves, to achieve things together); and, multilevel learning (individual, small group and organizational level). In their third article, the importance of leadership, empowerment, protected time and reflective practice are stressed as core organizational characteristics of learning organizations. They argue persuasively that efforts to create learning cultures could benefit both the public and those who work within learning practices. These concepts will be explored further in the sections that follow on organizational learning.

Health Care – hospitals and nursing practice (as epistemic cultures). Estabrooks (2003) has commented on implications of evidence-based practice for administrators, organizations (primarily but not exclusively hospitals), and those who work in them (primarily nursing, but also applicable to other allied practices). Sixth categories of individual predictors of research use identified by Estabrooks et al. (2003) are: beliefs and attitudes, information seeking, education, professional characteristics, and other socio-economic factors. Attitudes toward research – having overall critical thinking capabilities, open-mindedness, inquisitiveness and curiosity – are apparently important predictors for research use, whereas the evidence in support others was equivocal. Organizational determinants are seen to be much more important. These factors include: organizational complexity – with greater functional differentiation, specialization and professionalism being associated with use; centralization of decision-making and authority – with centralization having a negative influence on adoption of innovations; organizational size – with larger organizations more likely to adopt innovations, although this may be associated with motivation, obstacles and resources; champion's presence – having a positive influence; and, organizational slack and available time – having expected effects.

Israeli leaders in organizational learning have also commented on structural and organizational characteristics likely to transform hospitals into more effective, evidence-based practice organizations. Lipshitz and Popper (2000) studied cardiac surgery and the internal medicine wards of a university affiliated hospital. They describe the structural facet – the organizational learning mechanisms (OLMs) as the "institutionalized and procedural arrangements that allow organizations to systematically collect, analyze, store, disseminate, and use information relevant to the performance of the organization" and the cultural facet "consists of shared values about which OLMs are likely to be enacted as rituals rather than as mechanisms to detect and correct error". The authors conducted semi structured interviews and made behavioral observations and suggest that the key OLM aspects, at least in the environment studied, were: physicians' rounds, reflection in and after surgery, clinical pathology conferences, morbidity/mortality conferences, video demonstrations, review of medical records, periodic reviews of treatment effectiveness, research reports, journal club, staff meetings, and nursing staff meetings. Key values that encourage learning are: transparency, inquiry, integrity, issue orientation, and accountability.

Estabrooks et al. (2003) states that she and her research unit has found that social interactions and experience are the two most important sources of knowledge for nurses. She notes that "how nurses produce the "own experience" through sharing of experiences with their colleagues is an underdeveloped area. A deeper understanding of this process, and its relationship to knowledge utilization, would make an important contribution to our understanding of how knowledge is used in practice" (Estabrooks, 2003)

Health care – addictions field. Reimer, Sawka, and James (2005) have reviewed historical developments in research transfer in the addictions field, reviewed factors that limit it, and suggest a strategic approach to research transfer that will address challenges faced by the field. Specifically, they trace developments in Canada to evidence-based medicine's beginnings at McMaster University and its origins linked to the Cochrane Collaboration. They note that critics of evidence-based medicine have been concerned that it tends to be "cookbook" in nature, ignores unique patient needs, oversimplifies decision-making, provides little guidance in areas where there are many varied views as to what constitutes effective treatment, and diminishes the value of forms of evidence (e.g. naturalistic inquiry, case material, and experiential sources) in favor of randomized trials. However, they do acknowledge that the originators of evidence-based medicine had never intended it to replace prudent clinical judgment tailored to the needs for patients (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). Suggested limitations to research transfer at various levels were identified as follows: (a) individual level – beliefs, attitudes, values; professional education and training, years of experience, treatment orientation, and personal background (e.g. recovery status); understanding and value of research and scientific methods; and perspectives of treatment clients; (b) organizational level – knowledge and skills of staff, burnout, organizational dynamics (e.g. leadership, change-averse culture, collegial support, bureaucracy), power and budget struggles, research relevance, timeliness, and information overload; (c) community level – community readiness, competing political interests and funding priorities, range of prevention strategies available with demonstrated effect, and willingness to apply long-term investments to realize prevention benefits, and (d) system-level commitments from funding bodies and research organizations to support research transfer activities (noting existing activity in Canada, e.g. through Canadian Institutes for Health Research, Canadian Health Services Research Foundation, Health Canada, Canadian Centre for Substance Abuse, Alberta Alcohol and Drug Abuse Commission, and Ontario's Centre for Addictions and Mental Health). With respect to enhancing research transfer, several suggestions are made, including: supporting the dissemination and use of guidelines through practice networks, recognizing the importance of relationships and encouraging these amongst researchers practitioners and policy-makers (e.g. through dialogue, interaction through studies, colloquia etc.); supporting consumer advocacy through information, instruction and broader awareness programs; workforce development through systems and structural change to orient toward organizational development, change management, skill development and evidence-based knowledge transfer; local leadership and championship in communities; They also suggest that the development of a conceptual model for such activities would be as useful next step.

Workplaces. Kramer and Cole (2003) have developed and applied a conceptual framework for knowledge transfer and utilization that includes four broad aspects of the process. These include the (a) the knowledge source and transferred knowledge – including a credible source, rigorous evidence, compelling idea, audience specific aspects; (b) workplace context – including such factors as ongoing change, receptivity, organizational structures, health and safety activities; (c) knowledge transfer intervention – including knowledge broker role, reception and champions, types and timing of activities, and intensity of interaction; and (d) knowledge use – including conceptual use, making an effort to use, procedural use, and structural use. This framework was used to design and implement a knowledge transfer intervention in three manufacturing workplaces in a effort to promote occupational health (emphasizing psychosocial aspects), evaluated the intervention through a case study design and demonstrated the value of sustained intensive engagement/interactivity (to generate a critical mass, and sustained commitment). Kramer and Cole (2003) highlighted that there is still need to understand the intensity and length of the interaction necessary to achieve effective knowledge transfer, to test different models in different settings, and to apply a mix of quantitative and qualitative methods in future work.

Kramer and Wells (2005) have also demonstrated the value and an approach that can be used to engage multiple worksites to have far reaching impacts. As there are more than 400,000 workplaces in Ontario alone, the Institute for Work and Health used knowledge brokers to engage and build a network of consultants and ergonomists from the occupational health and safety practice system to promote the adoption and implementation of a "Participative Ergonomic Blueprint Model" (essentially a workplace engagement process to improve occupational health and safety in the work environment). In this instance, their approach was described as a process model/conceptual framework including the following phases: establishing good will (identifying links, building trust and credibility, interactive dialogue on ideas and research); achieving reciprocality (identifying collaborative opportunities, holding executive level

meetings); knowledge utilization (research adapted to user context for conceptual, political and instrumental use); and creating long-term alliances (exchange of resources, projects, research and experience). The approach is much more systemic than the prior case study, is clearly interactive, and seeks to establish long-term sustainable linkages. Of the 12 industry/sector-based networks and two associations engaged, six demonstrated conceptual use, at least three used it politically, and four are reported instrumental use; and strong ties were established with the Institute for Work and Health. Kramer and Wells (2005) suggest several important lessons arise through their experience in applying network theory: (1) the network is not the end in itself and it is through the network that the knowledge and information products must flow; (2) networks are dynamic and require constant nurturing through sustained, intensive interaction; (3) the role of knowledge brokering between the research and practitioner community is a critical one that needs to be attended to by someone or else the links are not well made; (4) identifying nodal champions in networks is useful; (5) gaps can be identified by applying network analysis; and (6) evaluation of the effectiveness of networks can be achieved through process measures such as numbers of contacts, shared projects, exchanges and the three types of research use.

Public health system. The need to rebuild the public health infrastructure in Canada has been a regular topic of debate in Canada since the SARS and Walkerton and North Battleford epidemics. Several developments give hope for a renewal of the public health system in Canada. These include the creation of a Public Health Agency of Canada, expected changes in the Province of Ontario to create a provincial public health agency, the redevelopment of a national Public Health Network for Canada, and Federal Government commitment of funds to support the development of a nationwide strategy for chronic disease prevention and healthy living – including the creation of a national best practices system for chronic disease prevention. To inform the developments and to encourage evidence-based decision-making, the Canadian Institutes for Health Research – Canadian Institute for Population and Public Health commissioned a multi-agency work group to review the literature and interview key informants in Canada, United States, and the United Kingdom. This study (Kiefer et al., 2005) examined issues pertaining to the public health knowledge base (including evidence synthesis), knowledge transfer and exchange, knowledge uptake and utilization, and evaluation of knowledge transfer/exchange strategies. It is beyond the scope of this paper to review the findings in detail. However, it is useful quote their assessment of the field at this stage, as follows: "After decades of research evaluating the impact of dissemination strategies on research utilization, there are very few definitive answers as to how to promote the effective use of research evidence in practice, program planning, and policy development. The focus, therefore, has turned toward the underlying processes and factors that significantly impact on decisions to incorporate research evidence into policy and program decisions, as well as on the impact of increased interaction between research producers and research users on uptake." (Kiefer et al., 2005)

Also noteworthy, Kiefer et al. (2005) have suggested a Population and Public Health Knowledge Exchange and Uptake Framework that specifies functions that should be accomplished in an environment of sustained funding. These include the following: (1) active collection, annotation and registration of existing and in-progress research; (2) solicitation and identification of evidence gaps; (3) prioritization, coordination and generation of new research evidence; (4a) dissemination of existing and new research ("producer push" and "user pull"); (4b) evaluation and redesign of knowledge exchange and dissemination strategies; (4c) capacity-building and training of users to facilitate uptake and use of research evidence; (5) uptake and utilization of research evidence; and (6) iterative cycle of problem identification, policy/program development and/or decision-making, implementation, evaluation and redesign. Little attention was provided to capacity building per se, other than at the level of the individual user, although there was suggestion of the need for an evidence centre and network of users and producers of knowledge.

Dobbins and her colleagues at McMaster University School of Nursing are recognized leaders in public health knowledge synthesis and transfer in Canada (cf. www.health-evidence.ca). Their research clearly demonstrates that review groups involved with revisions to Ontario's mandatory programs and services guidelines under the *Health Protection and Promotion Act* used the evidence reviews in advising the Ministry of Health and Long-term care about priorities for future public health guidelines (Dobbins, Thomas, O'Brien, & Duggan, 2004). Furthermore, the importance of the review relative to other forms of evidence and relevance of the reviews to the new guideline were significant predictors. A prior study demonstrated local public health agency use of systematic reviews was high (85% of agency and 96% of

decision-makers) and position in the organization (directors and managers), expectation of future use (perhaps associated with a decision-making style), critical appraisal skills and ease of use being significant predictors (Dobbins, Cockerill, & Barnsley, 2001). At a national level, they have also conducted focus groups across Canada to determine public health decision-maker preferences for content, format, and channels to receive research knowledge. This research indicated an interest in personalized updates from her organization and an number of implications for knowledge translation generally (Dobbins, DeCorby, & Twiddy, 2004). These include the following: the importance of eliciting decision-makers' needs and preferences, need for ongoing assessment of environmental factors affecting needs, making information ready and easy to use and tailoring, source credibility, and the need for regular contact with decision-makers as part of the overall strategy of knowledge transfer. More recently, her work underscored preferences of Ontario health care decision makers beyond public health, and highlighted the need for the establishment of working relationships with health care decision-makers in policy and practice (Dobbins, Rosenbaum, Plews, Law, & Fysh, 2007). With her colleagues, Dobbins has also developed a very useful "framework for the dissemination and utilization of research for health-care policy and practice" including a variety of factors associated with uptake and use of innovations and research (cf. Dobbins, Ciliska, Cockerill, Barnsley, & DiCenso, 2002).

A study by Kothari, Birch, & Charles (2005) studied research utilization among healthy lifestyle teams in Central Western Ontario public health agencies that were either involved on not involved in developing a study about breast health and breast cancer prevention. Among three teams involved in an interactive manner during the development of the report, there was greater understanding of report and appreciation of the value of the report but not greater program activity consistent with the report, than among those not involved with the development of the study. This suggests a wider range of factors are implicated in implementation and redirection decisions.

Norman and Heurta (2006) have demonstrated, through the use social network analysis, the value to researchers, students and policy makers of meetings and the use of web-assisted technology in facilitating linkages and preliminary developments towards the creation of a community of practice in knowledge transfer and exchange (Norman & Huerta, 2006).

Significantly, in Canada, there have been important developments with respect to the creation of a Population Health Intervention Research Initiative for Canada (PHIRIC). A workshop was convened in by the Canadian Institute for Health Research in the early fall of 2006 (Canadian Institutes for Health Research, 2006) and a student summer institute in the summer of 2007.

Heart Health. The Canadian Heart Health Initiative, a program of research funded under the now defunct National Health Research and Development Program, was an explicit attempt by the Canadian Federal Government to engage provinces in a knowledge development and exchange strategy to define a population health problem through surveys of risk factors, demonstration projects which sought to transfer experience from international heart health initiatives (largely research studies funded by the US National Heart Lung and Blood Institute and located in California, Minnesota and Rhode Island, but also HeartBeat Wales and North Karelia), develop technologies to disseminate lessons in Canada, and eventually deploy these initiatives across Canada (McLean, Feather, & Butler-Jones, 2005; Robinson et al., 2004).

In Ontario, there was an explicit attempt to transfer knowledge and build organizational capacity for cardiovascular disease prevention. The experience in Ontario demonstrates that the best predictors of implementation of heart health in the public health system are organizational capacity, priority given to heart health, coordination of programs, use of resource centres and participation in networks (Riley, Taylor, & and Elliott, 2001). Furthermore, in depth case study research by Riley (Riley, Taylor, & Elliott, 2003) further describes the critical role of leadership (for coordination, partnerships etc.), structure (government support, municipal restructuring, formation of healthy lifestyle team etc.) and staff skills (including use of the resource system that supports knowledge transfer, collaboration).

In Saskatchewan, the heart health initiative took a multi-level approach to capacity building and integrated research into the project by applying participatory action research principles (McLean et al., 2005). They state: "One of the most interesting conclusions [from their experience and research] is that building the

capacity of individual practitioners has only a limited influence on improving health promotion practice. There is no doubt that the processes such as continuing education, networking and staff development are important for the development of knowledge, skills, and commitment of individual practitioners. … However, the ability of those individual practitioners to act in the world is influenced by factors that transcend their individual capacities. The organizational context within which they work and the larger environment within which their organization is situated have a substantial impact on the ability of health promotion practitioners to realize their capacity and put it into action. … Developing the capacity of individual practitioners is essential to accomplishing more health promotion work, but is not sufficient on its own. Without organizational development and environmental change, efforts to develop the capacities of individual practitioners may lead to yet another parallel with individualized approaches to health promotion: blaming the victim."

For these reasons, McLean et al. (2005) develop their model of health promotion at three levels: individual (knowledge, skills, commitment, resources); organizational (commitment, culture, structure, resources); and environmental (political will, public opinion, supportive organizations, and ideas and other resources) (McLean et al., 2005). They are strong proponents for the use of an action research approach that integrates research, practice and shared learning. The experience of others in public health further supports a participatory approach (Mercer, MacDonald, & Green, 2004).

Tobacco control specific. In Canada, at the federal and provincial levels, greater investments have been made in tobacco control than in other aspects of chronic disease prevention. The same is true in the United States given the experience with Master Settlement Agreement, the American Stop Smoking Intervention Study, and large scale state tobacco excise tax funded initiatives (e.g. in California and Massachusetts). It is interesting to note that the Robert Wood Johnson Foundation, American Legacy Foundation, and the American Cancer Society combined resources to create a Tobacco Technical Assistance Consortium to ensure technical support and training was available to states at a critical time to the development of state and national tobacco control in the United States. This knowledge exchange/transfer role is linked explicitly to the capacity building function – include venturing into the areas of advocacy, lobbying, and legal matters (Niemeyer, Miner, Carlson, & Hinman, 2003).

Attempts have also been made to extract lessons from the experience with the development and implementation of population-wide comprehensive interventions in tobacco control to address the growing global pandemic of obesity (Chopra & Darnton-Hill, 2004; Mercer et al., 2003; Yach, McKee, Lopez, & Novotny, T. for Oxford Vision 2020, 2005)

Broader sector-wide dissemination strategies. Among those who have contemplated wide-spread application of evidence-based practice are several who recognize the value of diffusion of innovation theory (Rogers, 1983) as a useful heuristic for the design and execution of change strategies. Parcel's example of diffusion theory applied in the educational sector (Parcel et al., 1995) has already been discussed. But it has more general application. Berwick (2003)[19] has considered several implications of diffusion theory, including the perception of the innovation, characteristics of potential adopters, and aspects of the context and management issues within organizations. From these considerations he makes seven recommendations to health executives who want to promote the uptake of innovations within their organizations. These recommendations are as follows: (1) find sound innovations; (2) find and support innovators; (3) invest in early adopters; (4) make early adopters' activity observable; (5) trust and enable reinvention; (6) create [organizational] slack for change; and (7) lead by example.

Sanson-Fisher (2004) has also reviewed characteristics of the innovation, communication styles, decision processes, and social contextual factors that should be considered – but stops short of a prescription. Basch, Eveland and Portnoy (1986) in their discussion of diffusion systems for education and learning about health advise use of a two dimensional matrix and suggest the need to plan using both stages of change and units of analysis. The units, which comprise the rows of their matrix, are: individuals, small

[19] Berwick (2003) discussed the long history of scurvy on naval ships, noting a total time lapse of 264 years from the time of definitive initial study until the British Board of Trade introduced a definitive preventive policy. He also observed that Captain James Cook and his officers ate their sauerkraut (also contains vitamin C) in order for their men to trust their policy.

groups, organizations, communities, and larger macro-systems; and, the stages of change, which comprise the columns of their matrix, are adoption, implementation, and maintenance.

Greenhalgh et al. (2005) were funded by the United Kingdom Department of Health to conduct a systematic review on "diffusion, spread and sustainability of innovations in health services delivery and organization" in order to inform modernization of health services in the United Kingdom. They applied a meta-narrative approach, a rather novel strategy to uncover the "unfolding storyline" in 13 different research traditions including rural sociology, medical sociology, communications studies, marketing, development studies, health promotion, evidence-based medicine, structural organizational studies, cultural organizational studies, organizational network studies, knowledge utilization, narrative studies, and complexity studies. They approached the review systematically, pragmatically, with concern for historicity (order of studies), and transparently through a peer review and critique process.

Greenhalgh et al. (2004) have developed an elaborate conceptual model for consideration of the determinants of diffusion, dissemination and implementation based on this review. The paper (and one must suspect that their book – not reviewed) is quite useful in listing aspects of each facet that they have identified as relevant for consideration (the innovation, communication and influence, outer context, linkage, system antecedents, system readiness for innovation, adopter characteristics, assimilation elements (non-linear process, soft periphery, implementation process).

The authors suggest that the model is parsimonious. This is contestable. It is most certainly more complex (given a range variables and facets contained in it and it is internal redundant in some respects). Nonetheless, it is a contribution to be aware of and consider as key aspects of any knowledge exchange system are designed. It identifies seven metaphors for the spread of innovation based on a presumed scale of intensity of activity to affect the spread. These they name: emergence/adaptation; knowledge construction/making sense; diffusion; negotiation; knowledge transfer; dissemination/cascading; and, re-engineering. Given that it has developed meta-narratives from different paradigms, it is useful in questioning empirical findings and conclusions that are counter intuitive (e.g. champions may not be effective determinants of spread of evidence-based practice).

One must wonder however whether there is any clear advantage to such model to those already in wide spread application, such as diffusion of innovation theory and social cognitive theory. Perhaps their greatest contribution is in identifying the need for research that has the following characteristics: theory-driven, process (as opposed to package) oriented, ecological (and recognize reciprocal interaction), use common definitions, measures and tools, collaborative and coordinated studies, multidisciplinary and multi-method, meticulously detailed, and participatory – and generally, to take a more "whole systems" approach to studying organizational innovations.

Manske and Leithwood (Unpublished manuscript) have reviewed the limits of research funding agency sequential models of research dissemination (e.g. failure to encourage user participation in the process of research), the challenges faced by academics (e.g. reward systems that do not acknowledge time and effort required for user engagement), and the utility and limits of diffusion models based on top-down (centre-out) models of communications. They suggest a model that would focus future conceptual and research attention on more active involvement of research users and providers. Their model suggests that greater attention should be given to the variable dimensions of *context of use* (including commitment and receptiveness of individuals, organizations and communities based on factors such as historical experience, leadership and needs for knowledge, their current priorities, and available resources), *interactive/social processing* (i.e. involvement, ongoing contact, and engagement contributing to interpretation and sense-making) and eventual *use* (i.e. information processing, instrumental/decisional use, conceptual/learning use) of research and knowledge.

Government use of university research. Landry and his colleagues at University of Laval have studied the extent and determinants of the utilization of university in Canada, as well as differences among various sectors (policy domains) including health care (Landry, Lamari, & Amara, 2003). They have also studied university researcher behavior and perceptions about the use of their research (Landry, Amara, & Lamari,

2001; Landry, Lamari, & Amara, 2001) and assessed factors associated with instrumental, conceptual and symbolic use of research findings (Amara et al., 2004) and these are worth discussing.

Landry et al. (2003) reported on the findings of a questionnaire survey of some 833 government officials working in government agencies across Canada including individuals working at federal, provincial, and local levels, in various departments (policy domains). They conceptualized and operationalized the utilization variable as a index with seven stages of use (derived from work previously published by Knott and Wildavsky, 1980) and also applied by Lester and Wilds (Lester & Wilds, 1990). The stages are: reception, cognition, discussion, reference, effort (adoption) and influence. Their independent measures were, based on the literature, in the categories of engineering factors (i.e. science-push factors such as quantitative/quantitative type, theoretical products, focus on scholarly knowledge), organizational factors (e.g. focus on users' needs, context, work and policy relevance, size of organization etc.) and two communities' factors (e.g. adaptation of products, acquisition efforts, linkage mechanisms, and individual attributes such as whether they had undertaken graduate studies). They conclude that university research is more commonly used than previously presumed – and users' adaptation of the research, acquisition efforts, links between researchers and users, and users' organizational context all had an impact on the level of use. They were surprised to find that efforts to focus research projects on users' needs did not have a greater impact.

Amara et al.'s study 2004) reports a different analysis of the same survey but in this instance analyzed data for instrumental, conceptual and symbolic use. They found that 12%, 22% and 16% respectively were the reported rates of "very important" and "decisive" for instrument, conceptual and symbolic use and note that social services, *health* and social security, and education and information technology had higher uses in all categories of use than the other sectors (e.g. environment, forest, fishing, and agriculture, economic and fiscal, language, culture and immigration, job creation and employment standards sectors).

Landry et al. (2001) have also reported on a study of 1229 social science scholars across Canada (in 55 universities in anthropology, economics, industrial relations, political science, social work and sociology). They found that nearly 50% of all scholars surveyed reported that they always or usually transmit their research findings to professional, practitioners, and decision-makers; and 20% report never doing this. About 12% of respondents reported that their research results usually lead to applications – and social work and industrial relations had higher rates of application. Arguably those with greatest direct interest in application of their research are more likely to report higher use of their research.

V. Knowledge Management and Organizational Learning in Business Environments

In this section, a selective literature review is presented to reveal key concepts from business and management literature pertaining knowledge management and organizational learning. It is divided into four subsections. The first lays out some fundamental concepts relevant to each of the perspectives that follow. The following three sub-sections will discuss different perspectives that have been used to describe knowledge creation and management in business environments[20]. In order of discussion, these are as follows: *structural organizational perspectives* characterized by a behavioral approach to organizations, concerned mainly with the mechanisms and observable structural elements; *socio-cultural perspectives* characterized by the social construction of knowledge, identities, and purposes; and, *ecological and systems perspectives* which are characterized by recursive models of adaptation, learning and development[21].

[20] Blacker discussed five different images of knowledge (Blackler, 2002) suggested by Collins (1993). It could have been used but does not make a clear distinction between the ontological and epistemological dimensions. The five images are as follows: (1) *"Embrained knowledge* is knowledge that is dependent on conceptual skills and cognitive abilities" (knowledge that, knowledge about) – Argyris double loop learning, Senge mental models; (2) *"Embodied knowledge* is action oriented and likely to be only partly explicit" (know how, knowledge of acquaintance and understanding); (3) *"Encultured knowledge* refers to the process of achieving shared understanding. Cultural meaning systems are intimately related to the processes of socialization and acculturalization; such understandings are likely to depend heavily on language and hence to be socially constructed and open to negotiation" (new metaphors); (4) *"Embedded knowledge* is knowledge that resides in systemic routines" (social and institutional arrangements, routines, organizational competencies); (5) *"Encoded knowledge* is information encoded in signs and symbols" (books, manuals, codes of practice, including electronically encoded).

[21] The ecological and systems perspective could have been subsumed within the structural organizational perspective; as the social network perspective is subsumed within the socio-cultural perspective.

Fundamental concepts. What is knowledge? What is the difference amongst the terms: data, information, knowledge, information, intelligence, and wisdom? Are there different types of knowledge? What is learning? What is organizational learning? What is the difference between organizational learning and adaptation? What are the sources of new information and knowledge (i.e. innovation)? These are questions to be addressed briefly in this section.

Knowledge. Knowledge is a complex concept. It is a term that everyone understands, yet it conveys different meanings to various people. Nonaka (1994) has observed, since the time of the Greek philosophers, there has been a never ending search for the meaning of knowledge. Nonaka and Takeuchi (Nonaka & Takeuchi, 1995) state the western philosophers have agreed generally with Plato's conception that knowledge is "justified true belief" and belief in truth does not constitute true knowledge if there is doubt. Therefore, Nonaka and Takeuchi (1995) consider knowledge to be a "dynamic human process of justifying personal belief toward the 'truth'".

They also make a distinction between knowledge and information (Nonaka, 1994) in which they suggest that: "… information is the flow of messages, while knowledge is created and organized by the very flow of information, anchored on the commitment and beliefs of the holder." As such, it appears that knowledge is seen to be an active and subjective phenomenon and that information flow, including information that contains subjective meanings of the originator is seen to be as source for "justifying truth beliefs" or knowledge, i.e. belief without doubt (using Nonaka and Takeuchi's conception).

Differentiating knowledge from other concepts. Knowledge is different than information and other related concepts. Ackoff (1999)makes the following distinctions among data, information, knowledge, intelligence, understanding, and wisdom, as follows: "Data considers of symbols that represent objects, events, and their properties"; "Information is contained in descriptions, in answers to how questions that begin with such words as who, what, where, when and how many"; "Knowledge is contained in instructions. It consists of know-how"; "Intelligence is the ability to acquire knowledge"; "Understanding is contained in explanations, answers to "why" questions"; "Wisdom is the ability to perceive and evaluate the long-run consequences of behavior" (Ackoff, 1999). According to Ackoff, knowledge is seen therefore to go further than information and is actionable, as contains instructions on information on how to act.

Two interrelated types of knowledge. A key aspect of knowledge is whether it is made explicit or remains tacit. Polyani's book (1983) on this subject is often cited in the business literature as a key source for the distinction between tacit and explicit. He starts with the fact "we know more than we can tell" (p. 4).

Generally, knowledge is considered explicit if it is codified or articulated and tacit if it is not formalized and communicated. Tacit knowledge is experiential and not verbal. It is context specific, rooted in experience and is strongly related to action (Nonaka, 1994). For Polyani (1983), Gestalt is a experience that integrates awareness of aspects of experience without being able to identify with specific aspects and for Polyani the search for knowledge through this process is essential to the expression of creative genius, both scientific and artistic[22]. According to Polyani, knowledge whether tacit or explicit can be of two varieties – know how (können to Germans) and know what (wissen to Germans) (Polyani, 1983). Both are experienced, are at once intellectual and practical, and coexist together.

Gregory Bateson, an often cited author and originator of ecological concepts applied in organizational learning and action research, discussed his understanding of the relationship between knowledge and experience as follows: "The word "know" is not merely ambiguous in covering both *connaître* (to know through the senses, to recognize or to perceive) and *savoir* (to know in the mind), but varies—actively

[22] "Gestalt… as the outcome of an active shaping of experienced performed in the pursuit of knowledge. This shaping or integrating I hold to be the great and indispensable tacit power by which all knowledge is discovered, and once discovered, is then held to be true. The structure of Gestalt is then to recast into a logic of tacit thought, and this changes the range and perspective of the whole subject. The highest forms of integration loom largest now. These are manifested in the tacit power of scientific and artistic genius." (Polyani, 1983)

shifts—in meaning for the basic systemic reasons. That which we know in the senses can *become* knowledge of the mind" (Bateson, 1972)

Recall for Ackoff the distinction between information and knowledge pertained to "what" and "how" respectively, and perhaps this is a useful distinction. For now, it is sufficient to note that important philosophers and business thinkers have seen the tacit dimension as generative of knowledge, which can codified (with the use of symbols, words etc. per Ackoff's notion of data) into information (Ackoff's definition) and transformed into actionable knowledge[23].

Learning. Learning for Ackoff (1999) is the act of acquiring of information, knowledge, understanding or wisdom. Bateson (1972), whose life contribution to ecological models, organizational learning, systems thinking, and action research has been profound (Hawkins, 2004), developed a classification scheme for learning which has provided the bases much thinking about organizational learning regardless of perspective. He distinguished several varieties of learning as follows: *"Zero learning* is characterized by *specificity of response*, which—right or wrong—is not subject to correction. *Learning I* is *change in specificity of response* by correction of errors and choice within a set of alternatives. *Learning II* is *change in the process of Learning I*, e.g. a corrective change in the system of *sets* of alternatives from which choice is made, or it is a change in how the sequence of all experience is punctuated. *Learning III* is *change in the process of Learning II*, e.g., a corrective change in the system of sets of alternatives from which choice is made." (Bateson, 1972) From this schema comes the notion of single-, double- and triple-loop learning which correspond to learning I, II and III above and these will be discussed again below in the section dealing with ecological and systems perspectives. It also worthy to note that Bateson considered information to be a "difference that makes a difference", that is a unit of information that is sensed and affects the behavior of a system (Bateson, 1972).

Organizational learning[24] and adaptation. At an organizational level, organizational theorists have considered organization learning to be the acquisition of organizational knowledge or insights, the creation of new structures or systems, adoption of new actions, or some combination of these. Learning is presumed to happen at multiple levels within an organization – by individuals, small groups, divisions, and at the organizational level. Fiol and Lyles (1985)note that organizational learning is not just the sum total of learning at various levels, as organizations develop learning systems that assist immediate members, but they also serve to transmit norms and organizational histories – even as members come to or leave the organization. Culture, strategy, and environmental context all shape adaptation and learning. They review the literature to document how adaptation and learning have been discussed in the literature to that time. They then go on with well documented justification that the consensus is to equate learning at different levels with adaptation and learning (based Bateson's concept, as developed by Argyris and Schön (1978) and Hedburg (1981). Fiol and Lyles' (1985) describe lower-level learning as single-loop learning, short term temporary adjustments and the routine level; whereas, higher-level learning involves "the development of complex rules and associations regarding new actions. Development of an understanding of causation. Learning that affects the entire organization. Double-loop learning. Central norms, frames of reference, and assumptions changed." They therefore defined learning and adaptation at the organizational level as follows: "Learning: The development of insights, knowledge, and associations between past actions, the effectiveness of those actions, and future actions"; and, "Adaptation: The ability to make incremental adjustments as a result of environmental changes, goal structure changes, or other changes" (Fiol & Lyles, 1985).

Sources of innovation. Based on the different perspectives of knowledge creation and the role of business strategy, there are at least two separate sources of innovation that can be exploited by business – internal and external. Ichijo (2002) calls these two sources knowledge exploration and knowledge exploitation and defines them as follows: "Knowledge exploitations means enhancing intellectual capital of a company with existing knowledge, that is, public knowledge"; and "Knowledge exploration is a strategy for a

[23] Evidence can also be considered a particular type of information.

[24] Prange (1999) has extensively reviewed the literature and presented 8 definitions of organizational learning including the subject, content, incentives, resources, and processes of organizational learning that were the focus of different authors (cf. Table 2.1 – Prange, 1999).

company to increase its intellectual capital by creating its unique private knowledge within its organizational boundary. This unique knowledge must be valuable, difficult for competitors to imitate, and difficult to substitute." (Ichijo, 2002)

Ichijo further suggests that for exploitation, the primary strategies are acquisition and propagation, as well as imitation; and for exploration, the strategies are the development of knowledge that is unique, difficult to substitute, and difficult for competitors to develop (Ichijo, 2002). Simon has observed that most research knowledge is created outside an particular organizations and "that the main function of a laboratory [could suggest research department] is not the creation of knowledge but the acquisition of knowledge" and that "much more information comes through the eye that is scanning journals than the eye that is looking through the laboratory microscope" (Simon, 1991).

A related notion is that of absorptive capacity defined as "the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends" (W. M. Cohen & Levinthal, 1990).

Structural organizational perspectives

In this section several issues are discussed, in the following order. First, a brief summary of the a seminal behavioral theory of the firm is presented (Cyert & March, 1992). It is specifically discussed in terms of its operating mechanisms, factors that facilitate organizational adaptation and learning, and factors that constrain optimal rationality in organizations. Second, the notion of bounded rationality (Simon, 1991) as applied to organizational learning is further expanded. Third, various organizational learning constructs and processes, as discussed by Huber (1991), are reviewed. In addition, a classic review of organizational routines as stored memory (M. D. Cohen & Bacdayan, 1994) is presented. Fourth, multilevel organization cognition and memory as discussed by Walsh (Walsh, 1995) is summarized. Fifth, and last, Casey's (2005) development and application of Parsons' general (functionalist) theory of action is discussed.

Behavioral theory of the firm. Cyert and March's now classic *A behavioral theory of the firm* (Cyert & March, 1992) was first published more than forty years ago (1953). Since that time, the book and concepts contained in it have been analyzed and debated vigorously by other economists and social scientists. It has also be widely cited in the organizational learning literature, as it laid a foundation for discussion about organizational adaptation and learning in the midst of environmental changes. There were three key concepts[25] in the *"Behavioral theory"* and they are (1) bounded rationality – the observation that constraints of information and calculation constrain the ability of actors in organizations to behave perfectly rationally; (2) imperfect environmental match – the observation that the rules and practices that firms use are not completed determined so as to be fit the demands of the operating environment; (3) the firm is a coalition of interests, including individuals with their own interests to consider, and employment contracts permit the firm to retain its organization structure on the basis of these. The first concept requires organizational resolution and may be addressed by actors in the firm by simplifying decision-problems. Actors identify alternative targets and look for ways to achieve these (they do what that can); and they may focus on these targets and attend to the real goals later, or else revert to standard rules of thumb in these situation and see where this takes them. The second concept is addressed by organizational learning, i.e. changing the standard response by adaptation of goals, attention rules (what to pay attention to), and searching for solutions to problems. The third concept represents the constant, dynamic challenge of aligning individual and organizational interests (sometimes referred to as unresolved conflict and generally achieved by payments and delegation of decision latitude [i.e. positional status]) and explains in part the role of incentives in business. They also introduce the concept of "organizational slack" (differences between what the firm needs to pay its employs to keep employees, and the total amount paid) and suggest that it is a "cushion to survive in the face of adversity" and that is discovered often by organizations as an unrecognized opportunity when needed.

[25] Cyert and March (1992) "have suggested that a business firm is constrained by uncertainty of its environment, the problems of maintaining a viable coalition, and limitation of its capacity as a system for assembling, storing and utilizing information."

Bounded rationality. Simon's ideas on bounded rationality certainly influenced Cyert and March's analysis[26] (Simon, 1991). Organizational learning theorists have sometimes taken exception to Simon's statement: "All learning takes place in individual human heads". However, he went on to explain that organizational learning does occur by the learning of its members as a social phenomenon and by bringing in new members. In addition to the points discussed above, he has also noted that human learning in the contexts of organizations has many implications beyond individuals. Organizations are in fact systems of inter-related roles that prescribe decision premises (i.e. organizational role expectations) and these are constraints on rationality.

Organizational learning constructs and processes. Organizational learning constructs have been articulated by Huber (1991) in his broadly based review of the literature. While now almost 15 years old, there has not been any comparable analysis to explicate the processes so completely. He lists four principle constructs related to organizational learning: knowledge acquisition, information distribution, information interpretation, and organizational memory. His hierarchical description of these constructs is a follows[27]:

1.0 Knowledge acquisition
- 1.1 Congenital learning (inherited knowledge, don't begin with clean slates)
- 1.2 Experiential learning
  - 1.2.1 Organizational experiments
  - 1.2.2 Organizational self appraisal (including action research, single and double loop learning)
  - 1.2.3 Experimenting organizations (self design, survival and changing environments)
  - 1.2.4 Unintentional or unsystematic learning (including post decisional feedback)
  - 1.2.5 Experience-based learning curves (experience affecting efficiency)
- 1.3 Vicarious learning (mimicry, imitation)
- 1.4 Grafting (acquisition and grafting in new members with previously unavailable knowledge)
- 1.5 Searching and noticing
  - 1.5.1 Scanning (active or passive)
  - 1.5.2 Focused search (focus on problem symptoms, and in vicinity of existing alternatives)
  - 1.5.3 Performance monitoring (internal allocation, stocks and flows)

2.0 Information distribution

3.0 Information interpretation
- 3.1 Cognitive maps and framing
- 3.2 Media richness ("medium's ability to change mental representations within a specified time interval)
- 3.3 Information overload
- 3.4 Unlearning (learners discard knowledge)

4.0 Organizational memory
- 4.1. Storing and retrieving information
- 4.2 Computer-based organizational memory

Huber has also suggested that organizational learning is well characterized in terms of four attributes: *Existence* – "an organization learns if any of its units acquires knowledge that it recognizes as potentially useful to the organization"; *Breadth* – " more organizational learning occurs when more of the organization's components obtain this knowledge and recognize it as potentially useful"; *Elaborateness* – "more organizational learning occurs when more organizational units develop uniform comprehensions of various interpretations"; and, *Thoroughness* – "uniform understandings are the understandings across units of the possibly different interpretations" (i.e. so as to avoid groupthink) (Huber, 1991).

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[26] Cyert and March (1992) acknowledge Simon in their book for careful critique, comments and administrative support.

[27] The classification scheme presented here is the one developed by Huber (1991), modified with addition of remarks in parentheses to explain the concept when the meaning is not obvious.

This may be a useful (if yet under developed) classification schemes to understand the nature of organizational information and knowledge acquisition, processing and use within organizations.

Cohen and Bacdayan (1994) have also demonstrated that organizational routines – which they define as "multi-actor, interlocking, reciprocally triggered sequences of action" – also expressed stored behavioral memory. These are determined through experience, may not be verbalized, are encoded in procedural memory rather than "declarative memory", are rapidly recalled, and may be subject to error (sub-optimality) and present difficulties for unlearning.

Multilevel organizational cognition and memory. Walsh's review of the language of management theory has made it clear that notions of "cognitive maps", "frames of reference", "interpretive schemes", etc. are well recognized as important aspects of how thought is organized and retained in organizations (Walsh, 1995). He has also demonstrated that these have representations at individual, group, organizational, and industry-wide representations. He also suggests that behavioral patterns in organizations establish themselves as a sort of "hard ware" of the organizational mind, those behavioral patterns encode and communicate information, and that these interact complexly as social and collective minds. At an industry-wide level, shared knowledge serves as a common sense. Many of the notions surfaced here suggest the need for a socio-cultural interpretation of knowledge, while at the same time respecting its behavioral and routinized aspects.

Parson's theory of action. Casey recently applied Parson's theory of action to organizational learning. Casey's model derives from Parsons' functional sociological theory. It is interpretive in nature, systems-oriented, and embraces network aspects[28] (Casey, 2005). Comparable to Parson's four functional prerequisites for an organizational learning system, Casey envisions four functional subsystems which she labels: (1) environmental interface (relates to adaptation in Parson's model) which responsible for bringing information into the organization; (2) action-reflection (relates to goal attainment aspect of Parson's model) which is about activity to achieve goals; (3) dissemination-diffusion system (corresponds to integration in Parson's model) which is responsible to match information and knowledge transfer aspects throughout the organization through networking; and (4) the meaning-memory subsystem (relates to Parson's pattern maintenance) concerned with providing collective meaning and memory. This can be used to assess and understand the relationships between individual and organizational learning in organizations and diagnose learning needs[29] -- cf. Table 1 in Casey, 2005).

Socio-cultural perspectives

Nonaka (1994) has suggested that, in business, organizations have long been considered systems that dynamically address their environment, process information and solve problems – essentially an input/process/output model. However, this essentially structuralist orientation to organizations does not do justice to the internal dynamics that occur within organizations to generate and create innovation, including responses to problems as well as issues and aspirations that may not be apparent externally. In this section, seminal literature is reviewed to provide an overview of the socio-cultural perspective (actually a social constructivist point of view) on knowledge and knowing in organizations. This proceeds as follows. First, Kogut and Zander's (1996) concept of the role of firms in coordination, identity making, and learning is presented. Second, this is followed by a brief discussion of situated learning, legitimate peripheral participation, and socialization in the work place (Gherardi, Nicolini, & Odella, 1998). Third, contributions of communities of practice (E. Wenger et al., 2002) to meaning, identity of community members, and innovation (Brown & Duguid, 1991; Brown & Duguid, 2001; E. Wenger, 1998) is discussed briefly. Fourth, organizational learning as interpretation and sense-making is discussed (Blackler, 2002; Daft & Weick, 1984; Weick, 2001). Fifth, Nonaka and Takeuchi's four modes of organizational knowledge conversion (Nonaka & Takeuchi, 1995) are discussed.

[28] Casey (2005) defined organizational learning as "a system of action, actors, symbols, and processes which in turn increases its long-run adaptive capacity". While it is not consistent with the definitions of learning from Fiol and Lyles (1985), it is still applicable.

[29] Popper and Lipshitz (Lipshitz & Popper, 2000; Popper & Lipshitz, 1998) have referred to learning *in* organizations and learning *by* organizations to distinguish individual and organizational learning.

Coordination, identity making, and learning. Kogut and Zander (1996) proposed a knowledge-based theory of a firm. They proposed that firms should be understood in terms of their ability to create a social community that enhances the speed, and diminishes barriers and costs, of transfer of knowledge within this community. To do reduce such costs, there are requirements of specialization and division of labor. As Durkheim had suggested, the division of labor contributes as source of social solidarity, as individuals need for identity is associated with belonging to a labor group (subdivision). Kogut and Zander (1996) note that the division of labor encodes social knowledge into the structure of organizations and this defines and coordinates individual behavior (in a way, you are where you stand). Specialization also serves to generate a learning dynamic related to competencies required in an area of work, and this in turn is integrated into routines, procedures, and conventions in the work place. In a way, firms provide the structure and normative territory for the creation of members' identities, sets expectations for learning, and encourages particular patterns of performance.

Weick and Roberts (1993) have shown that in high risk environments such as air craft carrier flight decks, members of the flight teams can heedfully interrelate and develop a "collective mind[30]" where mindful comprehension increases and organizational errors decrease.

Kogut and Zander (1996) also argue persuasively that identification with a group and role improves coordination, communication and learning. They argue that organizational identification, which can be seen to be carried out through a process of self interpretation and characterization with certain enduring attributes (e.g. as being identified as a carpenter, doctor, scientist), and social stereotyping is influenced through social discourse. While people have difficulty in changing their fundamental beliefs about themselves, interpretations of contexts and learning situations are more malleable. Workplace leaders engage in and lead conversations in a sort of hermeneutical/interpretive process, often through the introduction of new metaphors, and mental models, which can shape learning in a group situation. Weick (2001) suggests that sense-making[31] is retrospective process that is socially constructed through collective interpretation and commitment to organizational courses of action (i.e. sense-making is committed interpretation of organizational realities, and these interpretations are socially constructed).

Situated learning, legitimate peripheral participation, and socialization. Gherardi et al. (1998) takes a social constructivist view of learning and knowledge that typifies this socio-cultural perspective of this subsection: "Knowledge is not what resides in a person's head or in books or in data banks. To know is to be capable of participating with the requisite competence in the complex web of relationships among people and activities. On this definition it follows that learning is always a practical accomplishment. Its goal is to discover what to do; when and how to do it, using specified routines and artifacts; and how to give, finally, a reasonable account of what it was done. Learning, in short, takes place among and through other people."

They also discuss the notion of shared understanding in communities of practices as shared custom and sustained practice. Such communities incorporate the characteristics of knowledge and learning that they described (above), Gherardi et al. (1998) after Bourdieu call "habitus": "The 'habitus' is a as system of durable, transposable dispositions or principles which generate or organize practices and representations …. a product of history that ensures the active presence of past experience by orienting perception, thought and action. It guarantees correctness of practices and their constancy over time even more reliably that formal rules and explicit norms. Absorbing and being absorbed in a 'habitus' includes knowing who is involved, what they do, what their everyday life is like, how they talk, walk, and work, and generally conduct their lives".

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[30] Mind is a term used by Weick and Roberts (1993) to mean "a dispositional term that denotes a propensity to action in a certain manner or style." Heed refers to the pattern of assembly of behaviours; and they note that "people act heedfully when they act more or less carefully, consistently, purposefully, attentively, studiously, vigilant, conscientiously, pertinaciously". Group performance is when people act as a social force, creates actions to interrelate as a system of collective action, and yet is also a function of style and strength of the individual activities that contribute to the overall organizational pattern.

[31] Weick (2001) has also used the phrase "How can I know what I think until I see what I say" to describe cognitive dissonance and its plural version to describe group/organizational sense-making – i.e. "How can we know what we think (or want or feel) until we see what we say (or do)".

Learning is therefore very much seen to be about roles, positions, power dynamics, and how people relate to their social context in organizational situations. The notion of "legitimate peripheral participation" refers to the process whereby a newcomer to a job (an apprentice for example) is provided opportunity for progressive involvement in a community of practice (to be discussed below) as s/he increasingly masters competencies necessary for participation. The word "peripheral" is use to signify that there is a path toward full participation, and "legitimate" is used to signify that, in the socialization of a group member or new staff, it is recognized that there is a legitimate period of learning as one moves toward full participation.

Communities of practice. Communities of practice have received considerable attention as a mechanism to ensure the efficient transmission of message amongst members of an organization or other system. According to Wenger, McDermott and Snyder (E. Wenger et al., 2002; E. Wenger, Accessed November 2004) "communities of practice are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis". To exist they require a shared domain (common cause, concern, interest), community (organization, role definitions, dynamics) and practice (knowledge to be shared, learned, experienced, and documented)

Wenger's (E. Wenger, 1998) social theory of learning considers meaning, practice, community and identity as being jointly developed together and are shaped by power dynamics, configurations of relationships, and subjective engagements with the world. In this regard, the Wenger's notion of communities of practice is very much an "interactionist" perspective (actually symbolic interactionist perspective as reification is a fundamental means to the construction of meaning discussed in Wenger's writing).

Brown and Duguid (Brown & Duguid, 1991; Brown & Duguid, 2001) describe central features of work practice which are used sometimes to legitimize work practice than is not sanctioned as part of normal job descriptions (i.e. non-canonical practice). These aspects are a narration (storytelling to map our their experience, theories etc. and act as repositories for experiences), collaboration and collective learning, and social construction (developing shared understanding in confusing circumstances, bricolage; and to develop a shared identity based on community experience)

Wenger et al. (2002) offer seven design principles to nurture communities of practice: design for evolution; open dialogue between inside and outside; invite different levels of participation; develop both public and private community spaces; focus on value; combine familiarity with excitement; and, create a rhythm for the community. They also identify factors such as distance, size, cultural differences, and organizational affiliations that may interfere with development of communities of practice. However, they do offer some prescriptions as to how these could be addressed (cf. Wenger et al., 2002; chapter 6).

Brown and Duguid (2001) have also written about the value of communities of practice for the study of knowledge creation. This includes the fact that they are sites of problem identification, insight, learning and knowledge generation; they are repositories of experience; they afford members opportunities to scaffold knowledge creation, building on other practices and experiences; and community of practice members are often part of larger professional and occupational groups that can assist in knowledge transfer. They have also noted that learning in one part of an organization may be difficult to transfer to another (sometimes referred to as stickiness).

Brown and Duguid (1991) have observed that explicit knowledge is generally easier transferred within organizations and across organizational boundaries (e.g. to other members of a community of practice) than lived experience, and tacitly held knowledge. Cook and Brown (1999) have suggested that explicit knowledge gives shape and discipline to "knowing" and call the reciprocal interplay between knowledge and knowing "bridging epistemologies".

Recently, McDonald & Viehbeck, (2007) have noted their value in health promotion as a mechanism to "build social and intellectual capital through mutual negotiation, reciprocity, trust and cohesion" among researchers and practitioners in tobacco control concerned with generating practice-based evidence.

Activity system and nature of organizational knowing. Blackler (2002) has redeveloped Engström's model of a socially distributed activity system (Engestrom, 1993) which includes agent, community, and object of activity aspects – as well as the use of instruments/concepts, rules (implicit and explicit) and roles/division of labor. It bears considerable resemblance to the triadic reciprocal model of Bandura (1986). He suggests that knowing in organizations is a dynamic process, involving tensions within this model of activity. Organizational knowing, Blackler suggests, is always *situated* (in work environments), *mediated* (by for example available resources such as technologies and tools), *provisional* (under constant evaluation and change based on the dynamics of the context), *pragmatic* (purposeful regarding objectives), and *contested* (subject to interpretation and conflicts). Taking a post modern perspective, he suggests that social systems are fundamentally unequal and based on Foucault's "discourse of perversions" "any theory of knowing as a cultural activity must acknowledge the often self-producing dynamics of domination and subordination that are a feature of everyday life" (Blackler, 2002).

Four modes of organizational knowledge conversion. Perhaps one of the most widely cited models of organizational knowledge creation is the model of Nonaka (1994) – later published in a book by Nonaka and Takeuchi (1995). They suggest that organizational knowledge creation needs to be better understood in terms of the processes that generate it in organizations as well as those that make it part of the network of the organization. The model is sometimes referred to as the SECI model, an acronym that corresponds to the four modes of knowledge conversion that it defines. Knowledge is seen to be converted and propagated (or not) in organizations in four ways: (1) tacit knowledge to tacit knowledge conversion, (2) tacit to explicit, (3) explicit to explicit and (4) explicit to tacit. The process for each of these conversions is named: socialization (S), externalization (E), combination (C), and internalization (I) respectively. The conversion of tacit knowledge to explicit knowledge through the use of metaphors is an important first step in the creation of new knowledge. Nonaka (1994) uses Bateson's (1972) concept of abductive reasoning, as a lateral extension of reasoning and applying metaphors, to understand the creative conversion.

Nonaka and Takeuchi (Nonaka & Takeuchi, 1995) also suggest that Japanese companies have had historically a strategic advantage in this area as they have not followed a western Cartesian orientation to thought, and have embraced as a matter of course "on-the-spotism" and reflection in action (per (Schon, 1983). They have also developed cultural concepts of "ba" which is the shared context experienced by those who interact to create knowledge (four kinds of ba, corresponding with the four SECI conversions (Umemoto, 2002). Ba, as a shared space for emerging relationships and information exchange, is seen as a foundation for knowledge creation in organizational systems (Nonaka & Konno, 1998; Nonaka, Toyama, & Konno, 2000; Nonaka, Konno, & Toyama, 2001). "Ba is a context that harbors meaning. The Japenese word *ba* denotes not only a physical space but a specific time and space, including a space of interpersonal relations". Ba called empathizing, conceptualizing, connecting, and embodying ba correspond to the four SECI elements, in that order (Nonaka et al., 2001). Leadership at top management levels can assist by articulating organizational knowledge vision; and, it is the role of middle management (as knowledge producers and stewards of it) to foster energizing ba (Nonaka et al., 2000). More recently, a role for "knowledge activists" and other important factors (discussed here also) were identified by Nonaka et al's review article (Nonaka, von Krogh, & Voelpel, 2006)

Ecological and systems perspectives

As the title suggests, this section addresses ecological and systems perspectives on organizational learning. Given the frequency with which Argyris and Schön (1978) are cited and the popularity of such authors as Senge (1990) one might be led to conclude that systems models of learning have played a dominant role in the development of organizational learning theory and applications. In this section, major concepts applied in general systems theory, ecological ideas, and systems thinking are identified. This is followed by a discussion of several major systems approaches, including systems dynamics, organizational cybernetics, and soft systems methodology. These approaches are concerned primarily with exploring purposes, improving goal seeking, interactive planning and improving organizational viability. Other approaches – including critical systems heuristics, team syntegrity, and postmodern systems thinking are not discussed (cf. Chapters 11-13, M. J. Jackson, 2005). The section closes with a short discussion about a few pragmatic and strategic approaches to organization learning and development.

General systems theory and ecological concepts. Senge (1990) has described "systems thinking" as a conceptual framework, as well as a set of knowledge and tools that is useful in understanding patterns of behavior in organizations and to see how change might occur. He also describes system thinking as a sensibility and a cornerstone underlying other key aspects of system practice (discussed below in the section on system dynamics)[32].

Jackson defined a system as "a complex whole the function of which depends on its parts and the interactions between those parts" (Jackson, 2005). He also discusses several key concepts that are integral to systems thinking and language. These key concepts include:

- holism (systems are more than the sum of their parts);
- open systems perspectives (systems that interact with their environment – taking inputs and transforming their operations and returning products to the environment);
- autopoiesis (self producing and sustaining qualities of organisms and organizations);
- control and communication (i.e. recursive feedback, particularly negative feedback);
- requisite variety (ability of the system to generate responses of sufficient variety to permit appropriate responses to environmental stimuli);
- purpose (problem orientation, responsiveness to interests);
- mental models (conceptualization of putative mechanisms in operation);
- learning (single- and double-loop);
- complexity (dynamic order and disorder/chaos governed in patterns repeated a different levels of the system); and,
- trans-disciplinarity (drawing on the insights from different disciplines).

von Bertalanffy (1968) is often credited for recognizing and articulating many of these concepts, including open systems and cybernetics, in his book on general system theory almost forty years ago. He defined cybernetics as "a theory of control systems based on communication (transfer of information) between system and environment and within the system and control (feedback) of the system's functions in regard to the environment" (von Bertalanffy, 1968). He also suggested that we not confuse system theory in general with the notion of cybernetics.

System dynamics. Jackson (2005) sees system dynamics as a having its roots in industrial dynamics, including an evolution from prior hard systems models to accommodate industrial and social phenomenon (e.g. population growth, natural resources, and agricultural production). What distinguishes it from prior industrial engineering approaches is an explicit focus on learning and understanding systematic relations among elements of a system by focusing on: the system boundaries, network of feedback loops, changes in rate/flow and stock/level variables, and leverage points. A number of methods (such as problem structuring, causal loop modeling, dynamic modeling, scenarios) are applicable to define "system archetypes" (Senge, 1990) that try to define the structures that govern the behavior of the entire system.

Senge's approach to creating a learning organization (1990) falls in this category of systems methodology according to Jackson (2005). His approach consists of organizational strategies that including system thinking, personal mastery, mental models, building shared vision, and team learning aspects. He advocates that organizations go beyond survival learning (sometimes called adaptive learning) toward generative learning, i.e. learning that enhances the capacity of the organization to create, not simply cope with environmental demands. Senge's term "mental models" is terminology that is often used to describe the understandings that people in organizations share about how the organization operates. In a sense, these are like causal maps and logic models. However, according to Senge these are actually "deeply engrained assumptions, generalizations, or even pictures or images that influence how we understand the world and how we take action. Very often, we are not completely and consciously aware of our mental models or the effects that they have on our behavior."

[32] Senge (1990) uses the term "metanoia", derived from Greek and meaning a shift or transcendence of mind, to describe the adoption of system thinking in organizations, i.e. in becoming a learning organization.

Argyris and Schön (1978) also stressed a similar notion in their approach to organizational learning. They stress the need to "learn to learn", essentially the organizational learning equivalent to Bateson's "deuterolearning" (Bateson, 1972) (labeling it O-II learning) and embrace it as a fundamental concept in their much cited book. Argyris (2004) more recently described double-loop organizational learning by applying the thermostat metaphor as follows: "Double loop learning is the detection and correction of errors where the correction requires changes not only in the action strategies but also in the values that govern the theory-in-use. Double-loop learning questions the status quo and encourages rare events. Single-loop learning is detection and correction of errors that do not require changing the values that govern the existing theory-in-use … A thermostat is a single-loop learner. It is programmed to increase or decrease the heat in order to keep the temperature constant. A thermostat could be a double-loop learner if inquired about why it should measure heat and why it is set so that the temperature is constant." (Argyris, 2004)

Unfortunately, many (perhaps most) organizations have adopted organizational routines that defend past practices and inhibit learning. Argyris and Schön (1978) call these organizational defensive routines. They suggest that such routines are maintained by the logic contained in four rules: crafting messages that contain inconsistencies, acting as if they are not, not permitting this to be questioned in the organization, and refuse to discuss the fact that things can not be discussed (essentially suggesting that an organization that is defensive is closed and unprepared to learn).

Argyris and Schön and Argyris and others (Argyris and Schön, 1978; Argyris, Putnam, & McLain Smith, 1985) have essentially adopted an action research approach the practice of organizational learning – adopting in a pragmatic philosophy to change and learning. In discussing their philosophical orientation to organizational learning and action research, they discuss John Dewey's approach. "Inquiry for Dewey combines mental reasoning and action. The Deweyan inquirer is not a spectator but an actor who stands within a situation of action, seeking to understand and change it." (Argyris and Schön, 1978) Such an approach to acting and studying in a system is not generally accepted as objective science, prompting Argyris to note the existence of defensive organizational routines in academia (Argyris, 1996), which he suggests dodges responsibility to assist with the making choices in organization contexts and failure to generate knowledge that possesses "implementation validity" (Argyris, 2004).

Crossan and Hulland (2002) have also developed a model that has leadership leveraging organizational knowledge creation through a dynamic systems model. Their model is predicated on four premises and a proposition. These are: "*Premise 1*: Organizational learning involves a tension between assimilating new learning (exploration) and using what has been learned (exploitation)." "*Premise 2*: Organizational learning is multi-level: individual, group and organization." "*Premise 3*: The three levels of organizational learning are linked by social and psychological processes: intuiting, interpreting, integrating, and institutionalizing (4I's)." "*Premise 4*: Cognition affects action (and vice versa)." "*Proposition*: The 4I's are related in feed-forward and feed-back processes across the levels."

The learning mechanisms in their model evolve from intuiting at the individual level, through interpreting as a group level process, to integration and institutionalization at the organizational levels. These organizational learning processes, which comprise their 4I framework, are further defined as follows: *"Intuiting* is a preconscious recognition of the pattern and/or possibilities inherent in a personal stream of experience"; *"Interpreting* is the explaining, through words and/or actions, of an insight or idea to one's self and to others"; "*Integrating* is the process of developing shared understanding among individuals and taking of coordinated action through shared understanding"; and, "*Institutionalizing* is the process of ensuring that routinized actions occur."

Crossan and Hulland (2002) operationalize this in a "strategic learning assessment map" (SLAM) with inputs and outcomes specified at each level and the learning processes associated with each. This is presented as Table C1 below. The findings from a survey of 336 employees at multiple levels in one large financial institution suggests that leadership is highly correlated with all elements of organizational learning; group learning has a strong and positive effective on employee and perceived shareholder satisfaction; it may be critical to financial success but may come at a price to some employee satisfaction; feedback positively affects satisfaction outcomes; whereas, feedforward (exploration and feeding ahead of

new knowledge) had a moderate effect on employee satisfaction and negative effects on shareholder satisfaction.

Table C1 – Strategic Learning Assessment Map
(Modified slightly from Crossan & Hulland, 2002)

Level	Process	Input/outcomes
Individual	Intuiting	Experiences
		Images
		Metaphors
Group	Interpreting	Language
		Cognitive map
		Conversation/dialogue
Organization	Integrating	Shared understandings
		Mutual adjustment
		Interactive systems
	Institutionalizing	Routines
		Diagnostic systems
		Rules and procedures

Organizational cybernetics. Beer's organizational cybernetics questioned the utility of organizational charts as models for organizations, as Jackson states "peoples' heads do not get bigger toward the top of an organization, except perhaps in a metaphorical sense" (Jackson, 2005). Nevertheless, Beer's model is a structuralist orientation to organizational behavior. Cybernetic principles are central (cf. Beer, 1981; Beer, 1984) and organizational properties at different levels of an organizational hierarchy can be founded to be repeated in other levels. Beer redefined cybernetics as the science of effective organization and set out a viable system model based on five necessary and sufficient subsystems to sustain any system, including humans and organizational entities. These have been labeled by Jackson (2005) as: *implementation, coordination, operational control, development and policy subsystems* (i.e. systems 1 through 5 inclusive in the viable system model). System one is the system that interacts with the outside world – retail and services aspects, which in turn deal with their own internal coordination, control, development and policy aspects. The higher levels of the system are a "meta-system" for subsystem 1 and should enable front line activity (interaction with the environment). Coordination is needed (system 2) to ensure that development (system 4) and policy (system 5) are in line with environmental demands, and are appropriately responsive to control or recursive feedback mechanisms (system 3). The higher levels of the system essentially enable the important interaction of the organism/organization with its environment. Moreover, the higher levels (2-5) should be seen to service the lower level systems functions. (Such models have been applied at national levels for environmental systems planning in Columbia.)

In discussing Beer's organizational cybernetics, Jackson (2005) identifies three levels of achievement and indices relevant to their measurement that can be used in to advance quality management approaches, through the control system. These are as follows: "actuality is what we manage now, with existing resources, under existing constraints; Capability is what we could achieve now, if we really worked at it,

with existing resources and under existing constraints; potentiality is what we might be doing by developing our resources and removing constraints, although still operating within the bounds of what is already known to be feasible. Then, the three indices are: productivity: the ratio of actuality and capability; latency: the ratio of capability and potentiality; performance: the ration of actuality and potentiality and also the product of latency and productivity" (Jackson, 2005).

Recent rethinking of the notion of absorptive capacity has also reframed it within a systems approach (Van Den Bosh, F.A.J., Van Wijk, & Volberda, 2005). New models include such factors as value recognition, social integration, power dynamics, and appropriation mechanisms (Todorova & Durisin, 2007).

Soft systems methodology. Organizations are, of course, complex entities and efforts to try to simplify organizational structures and dynamics through premature specification of models are problematic[33]. Similarly, in a limited number of non-specific, content and purpose-free dimensions (systems or otherwise) are likely not useful, other than as a conceptual and organizing heuristic. Soft systems methodology is a method that tries to address the challenge of organizational system model specification in difficult problem situations when team-building and other interpersonal dynamics may be at least as important as goal pursuit or about significant problem solving (Jackson, 2005).

Churchman, Ackoff and Checkland – three primary soft system thinkers – are all seen to have embraced an interpretivist approach to systems practice which is subjectivist and regulative, i.e. system serving (M. C. Jackson, 1982) – i.e. not of a positivist tradition, but rather more closely aligned to the social-cultural models discussed earlier in this paper, however contributing to system dynamics within which the process is embedded.

Checkland's methodology is most widely associated with soft systems methodology (Checkland, 1981; Checkland, 1983), although others have made important contributions to the practice principles (Wilson, 2001). Applying the interpretivist orientation to system problems, Checkland's methodology is based on in the first instance of "root definitions" – essentially socially constructed views or conceptual constructions of systems. By definition, these are "human activity systems" (HAS) in organizations.

A seven-stage cyclical learning system is used and the following are the stages in the process: (1) situation is considered problematic, (2) problem situation expressed, (3) root definitions of relevant purposeful activity systems, (4) conceptual models of the relevant systems (holons) named in the root definitions, (5) comparison of models and real world, (6) changes: systematically desirable and culturally feasible, and (7) action to improve the problem situation. (Jackson, 2005)

Root definitions are constructed by bringing various system actors together to specify customers, actors, transformation process, world view, owners, and environmental constraints (the "CATWOE"). Holons are conceptual systems models. These are constructed to facilitate debate about problem dynamics and what changes might be desirable to address them.

An integrative and pragmatic perspective on organizational learning . Argyris and Schön's classic text on organizational learning is frequently cited (Argyris & Schon, 1978), and the authors are arguably more closely associated with organizational learning than most other authors. Lipshitz has criticized their approach as having contributed to the chic, mystique and misconception of organizational learning (Lipshitz, 2000). He has observed that most researchers cite Argyris and Schön (1978), particularly the notions of single and double loop learning adapted from Bateson (1972), yet these notions are often peripheral to the concerns or research issues developed in the literature (evidence of 'chic').

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[33] "The advantages of mathematical models – unambiguity, possibility of strict deduction, verifiability by observed data – are well known. This does not mean that models formulated in ordinary language are to be despised or refused. A verbal model is better than no model at all, or a model which, because it can be formulated mathematically, is forcibly imposed upon and falsifies reality. … It may be preferable first to have some nonmathematical model with its shortcomings but expressing some previously unnoticed aspect, hoping for future development of a suitable algorithm, than to start with premature mathematical models following known algorithms and, therefore, possibly restricting the field of vision. … The system idea retains its value even where it cannot be formulated mathematically, or remains a "guiding idea" rather than being a mathematical construct" (von Bertalanffy, 1968)

Organizational inquiry – i.e. organizational members inquiring on behalf of an organization – may be observed behaviorally. To the contrary, organizational level double loop learning and theories of action at the organizational level can only be inferred from behavioral actions of organizational members. While Argyris and Schön argue for behaviorally grounded organizational practice, such organizational level theories of use actually contribute to the mystique behind the organizational (level) learning construct – the mystique (Lipshitz, 2000) generated through the anthropomorphism, i.e. treating organizations metaphorically as human beings (Friedman, Lipshitz, & Popper, 2005; Lipshitz, Popper, & Friedman, 2002; Lipshitz et al., 2007). Furthermore, the mystique is enhanced by the high relevance of their work and the attractiveness of their evocative terminology (e.g. inquiry, theory of action, model I, model II, double loop learning, higher level thinking, paradigmatic shift, defensive behavior (Lipshitz, 2000) Additionally, failure to differentiate concretely how individual learning is transformed into organizational level learning leaves the theory (as well as other theories at the organizational level that follow from it) open to criticism of misconception (Lipshitz, 2000). It also tends to downplay the importance of working organizational routines (i.e. effective single-loop learning).

To address these shortcomings in much of the organizational learning literature, Lipshitz et al.(Friedman et al., 2005; Lipshitz et al., 2002; Lipshitz et al., 2007) have proposed a multifaceted organizational learning model (Lipshitz et al., 2002) start with a definition of "*productive learning*" as "a process that (a) is conscious and systematic; (b) yields valid information; and (c) results in actions intended to produce new perceptions, goals and/or behavioral strategies" and is defined as a subset of Barnett's overarching definition of *organizational learning* as an "experience-based process through which knowledge about action-outcome relationships develops, is encoded in routines, is embedded in organizational memory, and changes collective behavior."[34] They argue that for organizational learning to occur (i.e. at the level of the organization), "there must be roles, functions, and procedures that enable organizational members to systematically collect, analyze, store, disseminate, and use information relevant to their own and other members' experience" (Lipshitz et al., 2002).

Lipshitz et al.(2002) suggest that organizations have observable mechanisms (non-metaphorical entities) analogous to the brain and central nervous system (as per Beer 1981; Beer, 1984) to enable organizational (level) learning to occur. These they call and define as organizational learning mechanisms (OLMs): "observable organizational subsystems in which organization members interact for the purpose of learning" (Lipshitz et al., 2002). These are further specified by whether the OLMs are integrated (or non-integrated) with task performance (i.e. reflective practice, reflection in action per Schön (1983); as well as whether they are designated specifically as OLMs to enhance future performance (e.g. post-flight and post-ordinance deployment reviews in the Israeli defense (Lipshitz, Popper, & Oz, 1996), post-operative reviews following surgery, rounds and other OLMs commonly used in health care (Lipshitz & Popper, 2000).

OLMs may be considered the "hardware" of organizational learning, which are necessary but insufficient to ensure that learning occurs in organizations (Popper & Lipshitz, 1998). Shared values and beliefs, as well an organizational context and culture that values continuous learning, valid information exchange, accountability, transparency and issues orientation are also essential (Friedman et al., 2005; Lipshitz et al., 2002; Lipshitz et al., 2007; Popper & Lipshitz, 1998). These other factors can be considered the "software" required for organizational learning (Popper & Lipshitz, 1998).

Lipshitz, Popper and Friedman's multi-facet model of organizational learning (Lipshitz et al., 2002; Lipshitz et al., 2007) is a comprehensive view of organizational learning that specifies structural (OLMs) and organizational context, policy, psychological, and cultural facets that contributed to productive learning. They suggest that the cultural aspects of transparency, integrity, and issue orientation, as well as inquiry and accountability contribute to productive learning through OLMs. Psychological safety contributes to transparency, integrity and issue orientation; and organizational commitment contributes to inquiry and accountability. A commitment to the workforce, a commitment to learning, and tolerance of error are three policy aspects that contribute to psychological safety; while commitment to the workforce

[34] Barnett's unpublished review of the literature and citation of Lipshitz (i.e. in Lipshitz, Popper, & Friedman, 2002) is Barnett, C. (no date), Rethinking organizational learning theories: A review and synthesis of the primary literature. Unpublished manuscript, University of New Hampshire, Whittemore School of Business and Economics.

can signal organizational commitment to learning. A number of contextual factors contribute to each aspect of the policy. These include error critically contributing to tolerance of error (e.g. less likely to tolerate error of human lives are at risk), environmental uncertainty affecting commitments and psychological safety (i.e. the degree of openness and defensiveness), task structure and proximity to the core mission, the commitment of leadership to the workforce and to organizational learning by workers and throughout the organization (Lipshitz et al., 2002; Lipshitz et al., 2007) In their recent book, they stress also the critical role of dissemination mechanisms and suggest that OLMs be considered "cultural islands" that exist and/or could be established within organizations to develop learning and dissemination cultures. The further suggest that such OLMs themselves should be the focus for organizational learning (i.e. learning about OLMs, as a sort of triple loop learning; (Lipshitz et al., 2007).

VI. Utilization of evaluation

In this section, evaluation use (or evaluation utilization) is first defined in terms of the variations of use that have appeared to date in the evaluation literature. Second, the relatively new concepts of "evaluation influence" is presented and discussed in relation to the ultimate purpose of evaluation, i.e. social betterment, and more specific purposes of evaluation. Third, a related notion of evaluation misuse (or mis-utilization) is reviewed briefly. Fourth, a brief discussion of the social aspects of evaluation use is included. Four aspects of social use are highlighted. These include the relationship between politics and evaluation; use as argumentation; knowledge accumulation and decision accretion; and, not using the evaluation (process or product) per se, but rather using the evaluator. Once evaluation use is defined and discussed, factors that affect various kinds of evaluation use are identified.

Four main types of evaluation use. The use of evaluation has been a long standing and never ending concern of professionals and organizations that engage in evaluation practice. Moreover, it is a topic that has been studied and debated extensively for more than 30 years, following the period of growth in evaluation activity in the 1960s, and continues to be a topic of research and conceptual development (Hofstetter & Alkin, 2003; Johnson, 1998) . The importance of the topic to evaluators is further highlighted by the fact that the Program Evaluation Standards include utility that state that they "are intended to ensure that an evaluation will serve the information needs of intended users" (Joint Committee on Standards in Educational Evaluation, 1994). However, there is no universally agreed upon definition of evaluation use/utilization (cf. Hofstetter & Alkin, 2003).

Like the many meanings of research utilization (Hofstetter & Alkin, 2003; Weiss, 1979) evaluation use is a multidimensional concept. Generally, there are four *major* kinds of evaluation use discussed and widely recognized in the evaluation literature. These are: instrumental, conceptual, symbolic and process use.

Instrumental use. *Instrumental use* pertains to the use of evaluation findings as the basis for decisions, problem solving and actions related to a program (Johnson, 1998). It is a concrete application of evaluation results and understanding to take direct action. Mark and Henry (2004) define this as behavioral use in their model of evaluation practice. Such definitions, of course, raise questions about the purposes of evaluation, a matter discussed at greater length below. Examples of direct, instrumental use are program continuation or termination decisions, modifications to the program operations to better meet client needs, and/or changes in the structure of the service delivery model – any or all of which occur following consideration of the findings of an evaluation.

Conceptual use. *Conceptual use*, also called enlightenment and/or demystification, is about affecting the thinking and knowledge of stakeholders (Johnson, 1998). Knowledge gains, changes in attitudes toward an intervention, understanding about how programs may work in some contexts or with some client groups but not others, and greater appreciation for the needs of clients are all conceptual uses of evaluation.

Symbolic use. *Symbolic use* – sometimes referred to as political, legitimative, conspiratorial, or persuasive use of evaluations – relates to providing information that is used to support or to strengthen positions with respect to a particular intervention (Johnson, 1998). To defend a program against funding cuts, to justify continuation of a service model, to advocate for additional resources are all examples of symbolic uses of evaluation.

Each of the above three forms of evaluation is results-based (Kirkhart, 2000). A fourth kind of use is process use.

Process use. Patton introduced the term *process use* (Patton, 1998) and has subsequently defined process use "as relating to and being indicated by individual changes in thinking and behaving, and program or organizational changes in procedures and culture, that occur among those involved in evaluation as a result of learning that occurs during the evaluation process" (Patton, 2002; p. 90), i.e. before or whether the evaluation report is submitted or not.

Process use may involve people learning to think evaluatively (i.e. learning how to learn) and thereby contribute to organizational learning. It may clarify goals or at least make values explicit, involve stakeholders so that learning is broadened by additional perspectives being represented (including hearing previously unheard voices), and/or be based on the generation of shared understanding through better or at least different communication (Patton, 1998).

Evaluations themselves may be integral to a programmatic intervention and/or serve as an intervention in itself by providing data that enhances the attainment of program outcomes, while also meeting evaluation needs. They may also support engagement, ownership and self determination through participatory, collaborative, and empowerment oriented approaches (cf. Chapter 5, Patton, 1997).

Forss et al. (2002) suggest that there are five different yet interrelated kinds of process use: learning to learn, developing networks, shared understanding, strengthening a program/project by incorporating evaluation into the intervention, and boosting moral through learning or other aspects of process use. Furthermore, they suggest that since most resources are spent in the process of designing and carrying out evaluations, rather than at the time of feedback, more attention needs to be paid in explicitly planning for process use as one of the most effective ways of increasing the overall usefulness of evaluations.

Other forms of evaluation use. Other forms of use have also been reported in the literature. For example, Carol Weiss has suggested that the accumulation of evaluation findings may result in other previously unanticipated kinds of use. For example, after the findings of several evaluations are compiled, systematic reviews may undertake and/or meta-analyses can be conducted. More often there is a haphazard aggregation of evaluation conclusions that could have impacts beyond the commissioning institutions (Weiss, 1998). Some might consider this a simply a form of enlightenment use with broad reach. However, the point is that already conducted evaluations might have additional applications in analyses and policy development, beyond what was originally intended.

Recently, with colleagues, she has also reported a new kind of use which has been labeled *imposed use*, where stakeholders are obliged to pay attention to evaluation results by virtue of the fact that funders are sanctioning programs that have been subjected to scientific inquiry (Weiss et al., 2005).

Evaluation influence. Kirkhart made a contribution to the field by advancing a theory of evaluation influence (Kirkhart, 2000). She suggests that it is appropriate to reconceptualize the field of evaluation use in order to move forward in an integrated manner, and shift terminology from use to influence. In her words (Kirkhart, 2000): "the term influence (the capacity or power of persons or things to produce effects on others by intangible or indirect means) is broader than use, creating a framework with which to examine effects that are multidirectional, incremental, unintentional, and non-instrumental, along side those that are unidirectional, episodic, intended, and instrumental (which are well represented by the term use)." (page 7)

This model of influence is represented by a three dimensional cube, with intention to influence (unintended and intended rows), source of influence (results and process columns), and time of influence (immediate, end of cycle, and long-term columns on the third axis) dimensions. Within this conceptualization, (a) there is a place for process use (Forss et al., 2002; Patton, 1997; Patton, 1998) which should be considered a legitimate source in its own right, i.e. not just as a means to facilitated results-based uses such as instrumental use; (b) the dimension of intentionality can be used to define indirect influences; and (c) effects are clearly not conceptualized as an event immediately occurring within or after the evaluation, and

recognize that there may be longer term impacts as evaluation results accumulate, e.g. as suggested by Cronbach and Associates through the accumulation of social knowledge (Cronbach, 1982; Cronbach & Associates, 1983) and in the type of accumulated use of findings suggested by Weiss (1998).

While a substantial number of authors cite Kirkhart's framework and acknowledge that it reconceptualizes evaluation as a broader concept than evaluation use, Leviton (2003) does not all agree that it is a substantial advance. Hofstetter and Alkin (Hofstetter & Alkin, 2003) also note that influence incorporates use and impact, and they strongly disagree with the change in terminology as it tends to ignore the basic purpose of evaluation which they see as being the improvement of specific programs being evaluated (see endnote 6, in their article). Weiss suggests that most evaluation use appears to be instrumental, conceptual, and political (Weiss et al., 2005).

Also noteworthy are Mark and Henry's criticisms of current models in the field of evaluation use/influence as being "impoverished" in so far as they do not explicate the mechanisms through which evaluation can have effects. They also see the field as "overgrown" with overlapping and conflicting use of terms. As a result, they caution against moving from one "thicket" to another by adopting the proposed concept of evaluation influence without clarifying the mechanisms and outcomes associated with it (Mark & Henry, 2004).

Weiss apparently agrees and suggests that Mark and Henry's theory of change (Henry & Mark, 2003; Mark & Henry, 2004) is a promising development that may advance the field of evaluation use/influence through greater systemization of research (Weiss et al., 2005).

Misutilization of evaluation. Patton's utilization-focused evaluation (Patton, 1997)is based on the premise that fostering intended use by intended users is the evaluator's prime responsibility. This pragmatic approach has been canonized in the Evaluation Standards. A concern to some evaluators who suggest that "the most critical issue for the utilization-focused evaluation is whether 'he who pays the researcher calls the methodological tune' (Pawson et al., 2005; p.14). Pawson and Tilley (Pawson & Tilley, 1997) suggest that social acceptability of ideas rather than veracity can result from a strict pragmatic approach, focused on user/buyer needs.

This concern is compounded by role definitions that may be acceptable to various evaluators. Patton himself notes that as use increases, so too will misuse—whether intentional or not—but it is not the evaluator's responsibility to police misuse. However, he is concerned enough about it to suggest that it should be a subject for study. As a preventive remedy, he suggests that working with multiple users that understand an evaluation's value may be one of the best measures against misuse (Patton, 1988; Patton, 1997). Alkin and Coyle (1988) note that little is known about how to prevent misuse and abuse of evaluation. Various forms of misuse can occur in the evaluation commissioning process (e.g. funding evaluation for symbolic political reasons, commissioning pseudo-evaluations (Suchman, 1967) during the evaluation process (e.g. delaying action, avoiding taking responsibility) or findings stage (e.g. misrepresentation, blatant non-use of sound evaluations, not presenting essential qualifications etc.; Alkin & Coyle, 1988). However, it is generally accepted that non-use of poor evaluations (i.e. misevaluations)[35] is appropriate use (Christie & Alkin, 1999).

Cousins provides a thoughtful analysis of the utilization and mis-utilization. He divides kinds of use/misuse into four quadrants that are created by two orthogonal axes (Cousins, 2004). One axis is use to non-use; the other is misuse to legitimate use. Cousins labeled the legitimate use/use quadrant "ideal use", which includes instrumental, conceptual, and symbolic/persuasive uses[36]. He labels the misuse/use quadrant "misuse" and includes mistaken use (due to incompetence, uncritical acceptance, and unawareness) and mischievous use (manipulation, coercion). The misuse/non-use quadrant is labeled "unjustified non-use" and includes abuse (inappropriate suppression of findings). Finally, the legitimate

[35] Poor evaluations may be judged using the Evaluation Program Standards of utility, feasibility, propriety, and accuracy. "In essence, misevaluation is designing an evaluation with a flawed methodology, careless data collection, sloppy analysis, and/or poor reporting" (Christie & Alkin, 1999).

[36] The author (i.e. John Garcia) would add process use to this quadrant.

use/non-use quadrant is labeled justified non-use and includes rational non-use and political non-use (Cousins, 2004).

Social aspects of use of evaluation. Social aspects of use are critical to both the definition of use and understanding factors that are associated with evaluation use. Four aspects of the social aspects of "use" are highlighted in this section – politics, arguments, decision accretion, and using the "evaluator", as opposed to the evaluation per se. When use is considered to be a social, as opposed to an individual phenomenon, these aspects might be considered to be key defining aspects of use (i.e. as opposed to social factors that affect individual use per se).

Politics and evaluation. Eleanor Chelimsky has discussed the role of experience in forming theories of evaluation practice (Chelimsky, 1998). While she was not commenting specifically on evaluation use exclusively, her insights are important. They make it clear that evaluation practice is deeply embedded in the general political environment, the history of the topic under evaluation, and political, social and economic values embodied in the policy or program evaluated itself (Chelimsky, 1998). For example, the user of evaluations may not be in their current positions when the evaluation is complete. Sometimes the intended use by intended users can change due to shifts in policy environment. There is also a "fog of war" that surrounds controversial and contentious topics – i.e. jockeying for political position and advantage. Substantial lobbying and advocacy efforts by interest groups may generate conflict. In such instances, legislators ask evaluators to make sense of the chaos – i.e. to be of assistance in interpreting different and sometimes conflicting knowledge claims, and to bring new information to inform debate. Chelimsky suggests that politics is *central* to evaluation practice. It is not simply a matter of context that intrudes on good practice and, but rather should be seen as a driver of it.

Furthermore, evaluation processes, including use, are embedded in program and policy history. Evaluation as a knowledge construction activity can do well to understand the historical and contextual aspects of programs, as politics and values are inherent in all social programs, and most certainly integral to interpretation and use of evaluation findings. She notes that the "scalding nature of some advocacy battles" have not adequately been portrayed in the evaluation literature. Yet in spite of this, and indeed perhaps because of it, instrumental use is frequent and not rare in such environments (Chelimsky, 1998). While Chelimsky's experience is grounded in US legislative and executive branch evaluations and at NATO and the World Bank, similar experiences can and do play out in other political and governmental environments. For example, Marra (2000) has noted that while links between evaluation and use may not be always clear – as in the case of the World Bank's anti-corruption unit, examples demonstrate that utilization does occur that bring about meaningful changes in program design and implementation.

If politics is central and not simply the surround, and if evaluators are called on to make sense in the midst of chaos, we need a concept of use that recognizes the elements of political use. Perhaps sub-classifications of forms of political use, some of which may follow from or lead to other forms of use (e.g. arising from conceptual and contributing to instrumental uses), may also be helpful to illustrate evaluation use dimensions. Evaluation use as argumentation in social and political contexts is one such conceptualization.

Use as argumentation. Valovirta (2002) has proposed that argumentation be considered a form of evaluation utilization (Valovirta, 2002). According to this view, evaluative information and evidence is not considered to be indisputable. Furthermore, it is suggested that judgments and recommendations that emanate from evaluations cannot be true or false. However, they may be more or less convincing. Arguments are seen to be, in part, knowledge claims generated by an evaluator[37] through interpretation. There are four varieties organized hierarchical manner in terms of complexity of arguments: claims of fact and description, claims of synthesis and explanation, evaluative claims, and claims pertaining to action (i.e. recommendations about future program changes). These claims are seen to then enter into the social process through communication leading to: new and transformed comprehensions (i.e. understanding), confirmed comprehensions, or refutation – all as part of the interpretive process. This assimilated knowledge is "used" for persuasion, legitimization, criticism, or defense of positions which in turn has

[37] In this instance, the evaluator may or may not be a professional evaluator. It could be a political staff, or anyone else for that matter, that accesses evaluation findings for purposes of interpretation and knowledge claims.

effects within democratic institutions. This model could be considered another explication of "political use". However, it is included in this section on social definitions of use as it includes use as social interpretation and argumentation. That is, this variety of political use is defined at two levels of processing, each level with their own characteristic aspects: (a) at the individual level, interpretation leading to actual claims of knowledge of four varieties, and (b) at the social level, four varieties of communicative action (i.e. in the form of arguments). It also gives further explanation to the mechanisms observed to be important in thick political environments (Chelimsky, 1998).

In some forms of evaluation, for example dialogic evaluation, the engagement process (one might say immediate use) is central. Greene (2001) sees engagement with its moral, relational, and political aspects to be a fundamental values commitment in her form of evaluation. She also notes that "Dialogic evaluation seeks to be of the world, not just to report on it" (p.186). This makes distinctions between an actual evaluation, engagement processes, and use (and the world for that matter) difficult to distinguish in this form of evaluation.

Knowledge accumulation and decision accretion. The traditional view of evaluation knowledge use is something like: information, analyses, and interpretations from a new and current evaluative research project are presented; and this can lead to a decision in an eventful and clearly purposeful manner, and such decisions are clear-cut and straightforward (Weiss, 1980). Weiss (1980) however has discussed the fallacy of this view of decision-making, particularly in large organizations. Rather than resulting from the systematic and conscious use of information, policy decisions can evolve over time as management takes decisions to accommodate changing circumstances. No formal agenda setting, deliberation and choice may be apparent. Rather, knowledge accumulates (arguably a cumulative and social form of conceptual use) and policies accrete in response to real world demands. Weiss notes (1980) that: "Social science, by helping to structure people's perceptions of social reality, seems to have pervasive effects. It provides an underlying set of ideas, models of interaction of people, conditions and events, which enter into our images of how the world works." (p. 397)

Similarly Forss et al. (1994) have taken a social constructionist perspective that groups, organizations and society more generally construct their social realities (per Berger & Luckman, 1966). In this view, evaluation can play a role in organizational learning (i.e. use at an organizational level) incorporating what an organization has processed into its overall dominant knowledge structure through single (adaptive) and double loop (fundamental assumption testing) learning (Argyris & Schon, 1978).

Prior evaluative research studies – on the shelf, in decision makers' experience or the organizations collective mind (Weick & Roberts, 1993) – may therefore form part of an organizational (and societal) ecology of knowledge or world view (Weltanschauung) that shape expectations through accreted policy change. Factors associated with this very indirect form of conceptual use, i.e. sedimentation onto existing working knowledge (Kennedy, 1983; Kennedy, 1984)and the value of the systematic accumulation of scientifically valid studies (Ginsburg & Rhett, 2003), are discussed below.

Using the evaluator. Developmental evaluation is a "long-term partnering relationship with clients who are themselves engaged in ongoing program or organizational development" (p.104) and the "evaluator becomes part of the design team helping to shape what's happening, both process and outcomes, in an evolving, rapidly changing environment of constant interaction, feedback and change" (Patton, 1997; p. 106). This relationship is developed in order to increase process uses of evaluation.

Patton has commented that the focus of process use is on being used, as an evaluator (Patton, 1998). The evaluator's credibility, reputation, knowledge and skills are seen by some (possibly by many) to be legitimate aspects to be used[38]. Disclosure of identity and roles of the evaluator must be clear among developmental evaluators acting in this formal consulting capacity. However, there is no pretense of being external – and to the contrary the evaluator may be seen as an integral member of the team. In such

[38] Patton (1998) commented on the evaluator being used: "My credibility is used; my reputation is used; my knowledge and skills are used. Thus, I do not worry about being used. I want to be used. I've dedicated my professional life to being used. However, I do not want to be misused or abused, and I do not want to contribute to misuse and abuse of others." (p. 232)

instances, as Patton has made clear (Patton, 1997), evaluators must assert that "dishonesty, corruption, data distortion, and selling out are not on the menu" (p. 112). Clearly, in this form of use, the evaluator in an organizationally situated evaluation process is the critical aspect of use – as opposed to the evaluation product per se.

What factors affect evaluation use? Given the central role of evaluation use to the evaluation profession, it is not surprising that there are several reviews identifying the range of factors that are associated with it. This review draws substantially on these prior studies (Alkin, 1975; Cousins & Leithwood, 1986; Hofstetter & Alkin, 2003; Johnson, 1998; Kirkhart, 2000; Leviton & Hughes, 1981; Leviton, 2003; Shulha & Cousins, 1997) and describes the major factors and their dimensions that are thought to be important influences on use.

Many classification schemes have been applied. Alkin (1975) analyzed four sets of factors – decision-maker and decision process, program and social context, nature of the evaluator, and the evaluation process and evaluation report. Leviton and Hughes (Leviton & Hughes, 1981) provide five tables identifying client needs, communication, information processing, credibility, and user involvement and advocacy. Cousins and Leithwood (1986) identify 12 factors: six associated with characteristics of the evaluation as implemented (evaluation quality, credibility, relevance, communication quality, findings, and timeliness) and six associated with the decision or policy setting (information needs, decision characteristics, political climate, competing information, personal characteristics, and commitment and/or receptiveness to evaluation)[39].

Shulha and Cousins (1997) build on the prior analyses and note recent developments (between 1986 and 1997). They identified an expanding concept of use (particularly process use and a shift to organizational levels), greater emphasis on contextual factors, more collaborative modes of evaluation and varied roles for evaluators (e.g. facilitator, trainer, educator). Hofstetter and Alkin (2003) cover the same ground, and cite additional categorization schemes (these others were not reviewed by the author of the current paper). For example, they state that Patton (1997) identified 11 utilization factors from the evaluation literature – methodological quality, methodological appropriateness, timeliness, lateness of the report, positive or negative findings, central or peripheral objectives evaluated, presence or absence of related studies, political factors, decision-maker/evaluator interactions, and resources available for the study.

Johnson developed an extensive meta-theory[40] integrating all prior models, whether implied or explicitly presented in the published literature (Johnson, 1998). Johnson's schema includes three sets of variables – background variables, interactional/socio-psychological variables, and evaluation use variables (Johnson, 1998).

No paper reviewing the factors associated with use would be considered complete without presenting a list of these. The following categorization scheme is suggested: user and types of use (including but not limited to decision-maker and decision characteristics); characteristics of the evaluation itself; evaluator; organizational (internal) and environmental (external) contextual factors; and, interpersonal and interaction characteristics. Each of these synthesized lists were been prepared by the author, and were developed during a careful reading of each of the above cited reviews. As they result from an analysis of several authors' work, the categorization schemes do not match exactly with any one of the reviews. In addition, the author's inductive insights were also added to the lists as they were developed. These are presented as simple lists of factors that may be associated with use and a commentary is provided below on which are generally considered to be most important.

[39] Cousin and Leithwood subsequently added "interactive processes" including involvement, social processing, ongoing contact, engagement and diffusion to their conceptualization of use in school/educational settings (Cousins & Leithwood, 1993) and this has been further modified by Manske and Leithwood to more explicitly include source and information characteristics, and a wider range of contextual factors believed to be important determinants of use (Manske & Leithwood, Unpublished manuscript).

[40] Meta-modeling is a term developed by Johnson (1998) to describe an inductive theory-building approach that analyses published models, implicit and explicit. Through an iterative approach similar to grounded theory (Glaser & Strauss, 1967) the analyst cycles between the literature and the theory to develop the most parsimonious conceptual framework and a storyline.

Users and use characteristics

- types of use to which the user puts evaluation as discussed above (i.e. instrumental, enlightenment, political)
- professional prestige and reputation of the user (e.g. innovator category)
- numerosity – ability to comprehend numbers, statistical summaries, and other quantitative analyses
- philosophical orientation (e.g. liberal, conservative)
- political ambition
- working knowledge (including theories of action, mental models, schema, world views)
- open-mindedness, reflective practitioner stance
- commitment to issues, ways of doing business, acting on evaluation
- extent of change required for adoption
- characteristics of the change/innovation suggested – relative advantage, compatibility, complexity, trialability, observability
- operating orientation of the individual user – rationality, cooperativeness/competitive, powerful/powerless
- legal requirements (e.g. requirements to evaluate, need to apply scientifically validated interventions when publicly funded)
- propensity to take risks
- intention to take a decision (or not) – including misuse and abuse related plans
- communication styles – written (electronic, paper) or verbal, direct/mediated, time available
- primary intended user or broker/mediator
- mindshare – amount of time to focus on a priority
- expected tenure in role (i.e. temporary or permanent)

The evaluation itself

- for whom the evaluation has been commissioned
- purpose of evaluation – program improvement, summative judgment, knowledge generation, accountability
- type of evaluation model (e.g. utilization-focused, empowerment, theory-based, dialogic, realistic etc.)
- relevance – the degree to which the evaluation actual attends to the needs of the user (aspect of "utility" test)
- type of information presented – efficacy, resource allocation, implementation related (e.g. RE-AIM factors)
- report timeliness – i.e. arriving in time to be considered, and considered properly
- technical quality – including study questions, design, data-gathering and analysis, including qualitative and quantitative aspects (aspects of "truth" tests)
- total elapsed time and cost
- report readability, comprehensibility and interpretability (amount of jargon)
- novelty of the findings and congruence with working knowledge/intuition
- reaction elicited – positive/negative, consistency with audience expectations
- what is measured, may be affected (Hawthorne effect) – what gets measured, gets done
- competing findings/information
- paucity/accumulation of prior research
- scope of recommendations

The evaluator

- past reputation
- credibility
- organizational affiliation
- independence – degree of cooptation
- inside/outside of the organization and degree of interaction with the program (see below also re: interaction)
- communication skills
- personality characteristics
- who compensates her/him and how much she/he is paid

Organizational (internal contextual) factors

- level within the organization
- where the evaluation is done
- where the use occurs
- where and how analysis is completed
- organizational constraints (e.g. bureaucratic requirements, sign-off, decision discretion)
- formal and informal structures
- communication patterns, networks, and dissemination vehicles
- time for consideration/reflection on evaluation
- competition within the organization
- history and age of the organization
- existing policy – formal and informal
- capacity – extent of technical knowledge, capacity for action/change
- organizational learning mechanisms to interpret/make meaning and engage in corrective action

Environmental (external contextual) factors

- visibility of the evaluation to external forces
- degree of politicization
- partisan or multi-/pan-partisan interests
- timing of the study – including in the program decision-making or policy cycle
- inter-organizational competition
- interest group and public expectations
- size and political importance of constituencies
- community characteristics
- turbulence/complexity – economic, social, technical environment

Interpersonal and interaction characteristics

- interaction from planning phases (e.g. evaluability assessments) – framing of interests, research questions, study purposes
- developing shared understanding
- user involvement and advocacy of findings/recommendations
- personal association, commitments and identity with evaluation
- user turnover
- relationship between the evaluator and decision-maker – longevity, trust, knowledge, respect, role clarity (evaluator integrity and reality testing role)
- degree of control over release and communication of information
- information processing styles – academic (critical, rigorous, conceptual) and administrator styles (only what is needed, less likely to scrutinize quality)
- "excessive evaluation anxiety"[41]
- "jointly negotiated decision-making and meaning making"[42]

Summary. The interdependent relationship among these factors is summed-up by Johnson's storyline (Johnson, 1998) as follows: "Evaluation utilization is a continual and diffuse process that is interdependent with local contextual, organizational and political dimensions. Participation by program stakeholders is essential and continual (multi-way) dissemination, communication and feedback of information and results to evaluators and users (during and after a program) help increase use by increasing evaluation relevance, program modification, and stakeholder ownership of results. Evaluators, managers and other key stakeholders should collaboratively employ organization design and development principles to help increase the amount and quality of participation, dissemination, utilization and organizational learning." (Page 104)

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[41] Excessive evaluation anxiety may be a barrier to the implementation and use of evaluations (Donaldson, Gooler, & Scriven, 2002) – characterized by conflict, withdrawal, resistance, shame, and anger. Other factors, such as lack of trust, relationships, social competence, personal cost-benefit analysis, power, performance feedback and self esteem have been identified as barriers and resistance to implementing evaluations in general (including therefore affecting process and results use). See (Taut & Alkin, 2003; Taut & Brauns, 2003)

[42] From Shulha and Cousins (Shulha & Cousins, 1997; p. 200)

Clearly, many of these factors are complex and evaluation use is likely to involve higher order interactions amongst the factors and dimensions on the list (Weiss, 1998).

There are also clear limitations to the research on evaluation use. Studies are have generally been either case studies or cross sectional surveys, with a few simulation studies. Self reported use is not validated, there is no triangulation of findings and instruments are not validated. Furthermore, studies are of insufficient duration to detect longer term effects of accumulated knowledge and decision accretion. As Laura Leviton has said "A standard of evidence that many of us would never dream of applying to the conduct of evaluations, too often predominates in the study of evaluation use. The consequence is that our frameworks may be built on sand" (Leviton, 2003; p. 526).

Critical role of process and interpersonal interaction. In spite of the methodological problems, evaluators' experiences lead them to the consistent conclusion that "process matters". For example, Carole Weiss (Weiss, 1998) has noted, "participative methods do seem to help. But they have their drawbacks as well" (page 23).

A survey of the American Evaluation Society's Topical Interest Group on Evaluation Use published in 1997 suggested that practicing evaluators in North America believe that evaluation use can most likely be enhanced by: planning for use from the beginning stages of the evaluation; identifying and giving priority to intended uses by intended users; designing evaluations that are within resource limitations; involving stakeholders in the process and communicating results to them; and, having a communication and reporting plan (Preskill & Caracelli, 1997).

This should however not be taken to mean that the quality and rigor of evaluation studies is not a factor. To the contrary, Ginsburg and Rhett (2003) suggest evaluation quality is a critical factor in evaluation use – particularly over the long-term. They suggest that "a useful evaluation of an educational program is one that adds to the body of timely, relevant evidence to increase the likelihood that policy decisions improve performance". Sound scientific evidence is a requirement for successful interaction, evaluator credibility and contribution to a body of evidence in to support effective program development. Experimental studies, systematic reviews, large scale databases, and detailed case studies are all important contributors to the interaction of evaluators with policy makers and greater use of evaluation findings. Moreover, high quality and rigorous evaluation research studies enhance evaluator credibility and thereby increase use of findings (i.e. they are not mutually exclusive, interaction should not diminish quality and to the contrary, quality interaction and use may actually increase due to high quality evaluation products).

In summary, the research is limited by design considerations and a paucity of tests of actual tests of interventions that seek to increase use and impact. However, given the consistency of the findings and agreement with in the field, it appears that the lists are likely fairly complete and interaction process related aspects are critical.

VII. Additional Theoretical and Conceptual Considerations

At least five additional and related considerations are germane to the development of a model of knowledge exchange. These are the application of existing theoretical and practical models that underpin many developments in the emerging science of population health promotion: (a) accepted planning frameworks that have been applied to health education, health promotion and proposed for wider application to health programs more generally; (b) major theoretical models that have been applied to guide health promotion scientific developments, (c) social cognitive theory, particularly the concepts of triadic reciprocity and collective efficacy; (d) potential value of a critical realist approach to understanding the morphogenesis of agents, cultures and structures, and (e) last, but not least, the paradigmatic approach to the construction of knowledge.

Planning frameworks. Arguably, there is no health promotion planning model that is more widely recognized and applied than Green and Kreuter's PRECEDE/PROCEED model (Green & Kreuter, 1980; Green & Kreuter, 1991; Green & Kreuter, 1999; Green & Kreuter, 2005). First applied as a diagnostic

approach to health education planning (Green & Kreuter, 1980) and subsequently to health promotion using environmental (Green & Kreuter, 1991) and eventually ecological principles (Green & Kreuter, 1999) for health promotion planning and evaluation, Green and Kreuter have evolved their model for a more general application to health program planning (Green & Kreuter, 2005).

It is beyond the scope of this paper to fully review the diagnostic planning and evaluation model they espouse (cf. Green & Kreuter, 2005). Suffice it to say that it is comprehensive, systematic, and recursive in orientation and is based substantially on the health belief model broadened sufficiently to address social, epidemiological, behavioral and environmental, predisposing-enabling-reinforcing determinants, and administrative (i.e. organizational and systemic) factors that should be considered in systematic planning and evaluation. The administrative diagnostic phase of their model (Green & Kreuter, 2005) is particularly relevant to the design of knowledge exchange systems for cancer control. They suggest some fundamental principles that underline the approach that they advocate. These are as follows: *principle of intervention specificity* – "there is nothing inherently superior about any intervention method, or any method of social change, for that matter. It always depends on the appropriate fit of the intervention with the person or population and their circumstances, and the delivery setting"; and, *principle of multiplicity and comprehensiveness* – "no single method or intervention by itself can be expected to achieve lasting change" and a corollary is that "social, group or individual change must combine educational, organizational, economic, regulatory, and other environmental change components."

They suggest the need for alignment of intervention approaches to multi-levels through different channels and actors/mediators to achieve optimal effect (cf. Figure 5.2 in Green & Kreuter, 2005), based on various theories of action (intervention) targeted to mechanisms to affect health objectives. They further suggest that it is important to develop program theory is based on two types of understandings/models – action theory (relating interventions to causes) and causal theory (relating causes to outcomes). They also highlight the important role for formative and process oriented research in tailoring and adapting interventions to fit their circumstances and note a wide range of variables that will have a facilitating or hindering effect on the implementation of interventions[43].

Major theoretical models. Best, Stokols, Green, Leischow and others (2003) have contributed to thinking about the need for and elements of a intervention framework of community partnering that has the potential to translate theory into promising health promotion strategies. Given the leadership role that they each of these individuals has played in tobacco control, ecological health promotion models, health promotion planning and applied research and evaluation, one must consider their vision seriously. They suggest that while there are multiple theories, concepts, and approaches to health promotion, there is a need for integrative synthesis and collaborative work toward a common understanding amongst researchers and practitioners. They further suggest that social ecology (Stokols, 1992), the PRECEDE-PROCEED model (Green & Kreuter, 1999), life course health development (Halfon & Hochstein, 2002), and community partnering models be considered to be overarching framing models. These models can be used to focus on various critical questions, including population health development, models of change, best practices, diffusion and policy. They also suggest that the critical next step is to invest in networks that promote and support ongoing dialogue to find a common framework and approach to community partnering.

The author suggests that social cognitive theory and realist social theory also provide power models that much to offer to research and practice related to knowledge exchange and organizational learning. These are reviewed briefly.

Social cognitive theory. Albert Bandura's social cognitive theory (previously referred to as social learning theory) is also relevant to social learning in organizational context of course. His widely-cited book (Bandura, 1986) laid out the notion of triadic behavioral reciprocity in which the person and environment interact reciprocally shaping both individual behavior and the environment. He has also noted that a

[43] Green and Kreuter also present Green and Lewis's list (Green & Marcus Lewis, 1986) of some seventeen different indicators that could be used to make trade-off decisions among programs. These include need (eligible population), reach (attendance), coverage (ratio of reach to need), impact (immediate effects), efficacy, effectiveness, program cost, efficiency, cost-effectiveness, benefits, cost-benefit, income, net gain (or loss), start-up costs, operating costs, operating cost-effectiveness, and operating cost-benefit.

comprehensive approach to health promotion requires a broadly based theory that can focus on change practices in social systems (Bandura, 2004).

Bandura (Bandura, 1986; Bandura, 2000; Bandura, 2001; Bandura, 2004) has clarified three different modes of human agency – personal, proxy, and collective. He notes that: "In many spheres of functioning, people do not have direct control over the social conditions and institutional practices that affect their everyday lives. Under these circumstances, they seek their well-being, security and valued outcomes through the exercise of proxy agency. In this socially mediated mode of agency, people try by one means or another to get those who have access to resources or expertise or who wield influence and power to act at their behest to secure outcomes they desire. …. People also turn to proxy control in areas in which they can exert direct influence when they have not developed the means to do so, the believe that others can do it better, or they do not want to saddle themselves with the burdensome aspects that direct control entails" (Bandura, 2001)

Furthermore, Bandura described collective efficacy – and the literature pertaining to it – as follows: "People's shared believe in their collective power to produce desired results is a key ingredient of collective agency. Group attainments are the product not only of shared information, coordinated, and synergistic dynamics of their transactions. Because the collective performance of a social system involves transactional dynamics, perceived collective efficacy is an emergent group-level property, not simply the sum of the efficacy beliefs and actions of individuals who make up a social system. It is people acting conjointly on a shared belief, not a disembodied group mind that is doing the cognizing, aspiring, motivating and regulating. Beliefs of collective efficacy serve functions similar to those of personal efficacy beliefs and operate through similar processes. …. The findings taken as a whole show that the stronger the perceived collective efficacy, the higher the groups' aspirations and motivational investment in their undertakings, the stronger their staying power in the face of impediments and setbacks, the higher their morale and resilience to stressors, and the greater their performance accomplishments" (Bandura, 2001)

Bandura describes the notion of triadic reciprocity involving person, social/organizational environment and behavior and the role of the individual as an agent of change as follows: "Although the self is socially constituted, by exercising self-influence human agents operate generatively and proactively, not just reactively, to shape the character of their social systems. In these agentic transactions, people are producers as well as the products of social systems. Personal agency and social structure operate interdependently. Social structures are created by human activity, and socio-structural practices, in turn, impose constraints and provide enabling resources and opportunity structures for personal development and functioning" (Bandura, 2001).

Realist Social Theory. One might suggest that the form of social theory advocated by Margaret Archer bears some considerable similarity to social cognitive theory. Clearly a critical realist in orientation, Archer has made a long standing commitment to advocating realist social theory that addressed fundamental questions about the relationship between agency and structure (Archer, 1995; Archer et al., 1998; Archer, 2000; Archer, 2003; Archer, Collier, & Porpora, 2004). She is clear in her position that neither societal determinism nor individual volunteerism is an adequate explanation of the social behavior of human beings. Archer has argued strenuously against the elision of structure and agency, as has Giddens in his duality of structure (Giddens, 1984) and in stead advocates separation for clarity in analysis and avoidance of conflationary theorizing (analytic dualism).

The transformational model of social action espoused by pre-eminent realist philosopher Roy Bhaskar (Bhaskar, 1998) is predicated on a ontology of *sui generis* reality in which society exists in a manner that governs activities of individuals, but social structures within it exist only in virtue of the agents/individuals within them. Furthermore, society (and its social forms, including organizations) is "an articulated ensemble of tendencies … which exist only as long as they are exercised [and] are exercised in the last instance via intentional activity of human beings …" (page 39). Archer (2000) describes this process as follows: "we are who we are because of what we care about: in delineating our ultimate concerns and accommodating our subordinate ones, we also define ourselves. We give a shape to our lives, which constitutes our internal integrity, and this pattern is recognizable by others as our concrete singularity.

Without this rich inner life of reflection upon reality, which is the generative mechanism of our most important personal emergent property, our unique identity and way of being in the world, then we are condemned to the impoverishment of either 'Modernity's Man' or 'Society's Being'... Realism revindicates real powers for real people who live in the real world." (p. 10). The process of change (in the development of peoples' emergent properties) that she suggests is conditioned by socio-cultural context and involves one's of discernment of interests, deliberation and dedication to projects (p. 231) and that this involves a combination of considerations in the natural, practical and social realms (i.e. physical well being, performative achievement, and self worth; passim p. 197) and in which practice is pivotal. Moreover, "Social reality enters objectively into our making, but one of the greatest of human powers is that we can subjectively conceive of re-making society and ourselves (p. 315). This is consistent with essentially the morphogenetic/morphostatic framework – "that structure pre-dates the action(s) leading to its reproduction or transformation", and "structural elaboration necessarily post-dates the action sequences which gave rise to it" (Archer, 1995; p. 15). Similar morphogenetic models are developed by Archer for people as agents (Archer, 2000; Archer, 2003), culture (Archer, 1996), and society (Archer, 1995).

Construction of knowledge. This paper reviewed structural organizational, socio-cultural, and ecological and systems perspectives on the conceptualization and study of organizational learning in business environments. Easterby-Smith and Araujo (1999) suggest that in addition to the technical and social views of organizational knowledge, that there are at least six main disciplines each with their own ontological assumptions making developments in each area somewhat incompatible and difficult to integrate. They suggest that observing developments in various fields of organizational learning (i.e. psychology, organizational development, management science, organizational theory, strategy, production management and cultural anthropology) may be useful, particularly with respect to noticing parallel developments[44]. The paradigmatic stance of researchers of various disciplines defines the aspects of knowledge that are seen as important and determine the role of the scientists in knowledge production, sharing and utilization.

Denis et al. (2004) have identified five models of knowledge utilization which they label: knowledge-driven, problem-solving, enlightenment, strategic, and interactive or deliberative. In the *knowledge-driven* model, which is based on a traditional view of science, the role of science is to generate new knowledge incrementally from a disinterested stance, with little consideration to factors exogenous to the phenomenon of interest to the scientist. The relationship is unidirectional, with scientist generating knowledge, assuming a "laissez-faire" stance vis-à-vis uptake by research consumers. The *problem-solving* model is fundamentally different, insofar as the practitioners formulate requests to experts and scientists in order to solve practical problems. The model is utilization-focused owing to the explicit orientation to practice decisions and the model defines a contractual, but interactive relationships, between scientist consultants and decision-makers. The *enlightenment* model assumes that knowledge is valuable in and of itself and that knowledge is useful to society to face complexity. The relationship between scientist and practice is seen to be random, although reframing of information and the promotion of ideas is seen to be legitimate under this paradigm (somewhat associated therefore with conceptual use). The *strategic* model sees knowledge as a resource that is accumulated, exchanged and used in the social and political interplay amongst actors; and a stakeholder orientation to knowledge utilization is paramount, with social entrepreneurs and knowledge champions playing a role in promotion of use. Knowledge is seen to be associated with influence, advantage and positions of power. The *interactive/deliberative* model is an extension of and synthesizes the enlightenment and strategic models. It is based on the assumption of co-production of knowledge by practitioners and researchers. It sees knowledge as socially constructed, requiring interpretation and validation through social interactions and public deliberation. Essentially this perspective assumes democracy is part of knowledge utilization, if not production, and participative approaches are embraced within this model.

[44] Champagne et al. (2004) have also reviewed various models of program evaluation from a paradigmatic perspective and discuss positivist, neo-positivist, and relativist paradigms cf. Table 6.1 in Champagne et al.(2004) for an analysis of ontologic, epistemologic, methodologic, and teleologic dimensions of these evaluation paradigms and this is based on a prior analysis of Lincoln and Guba, A more recent analysis by Guba and Lincoln can be found in another Table 6.1, in Lincoln and Guba (1989).

Denis et al.(2004), like the National Cancer Institute of Canada's working group on knowledge integration, suggest that society is evolving toward a new mode of knowledge production and utilization (which they label Mode II after Gibbons) in which: there are more centres of knowledge generation, greater attention paid to knowledge use and application, with a mix of disciplines and sectors, a "learning-by-doing" philosophy, seeing researchers as entrepreneurs, universities are required to come out of ivory towers and penetrate society, and research is contextualized for use.[45]

There are hopeful signs that such a shift is starting to appear in prevention science. The most notable is the development and promulgation of the RE-AIM model by Glasgow and colleagues – explicitly drawing attention to the failure of traditional science to generate (or at least publish) findings relevant to policy and program decision-making (Dzewaltowski, Estabrooks, Klesges, Bull, & Glasgow, 2004; Glasgow, Vogt, & Boles, 1999; Glasgow, Bull, Gillette, Klesges, & Dzewaltowski, 2002; Glasgow, Lichtenstein, & Marcus, 2003; Glasgow et al., 2004; Glasgow, Marcus, Bull, & Wilson, 2004). Information about staff/agent, setting, and system level factors necessary for successful adoption and wide spread reach of efficacious interventions is found to be lacking in the published literature. Glasgow, Lichtenstein, and Marcus (Glasgow et al., 1999) point out that the trickle-down approach (the knowledge driven model discussed above) is inherently flawed as an approach to generate relevant knowledge through the formal science establishment – a point that has been empirically validated (Glasgow et al., 2004).

One might also be encouraged by the applied orientation of some scientists and scientific thought leaders. Some scientists are actively collaborating with governments and practitioners to generate useful information pertaining to population-based risk factor interventions (e.g. (Cameron et al., 1996; Cameron et al., 2001; Cameron et al., 2006; Cameron et al., 2007; Grunfeld et al., 2004; Hanusik et al., 2003; Robinson et al., 2004) some applied (best practices) models have even recognized a wide array of factors relevant to decision-making (e.g. Kahan & Goodstadt, 2001; Kahan & Goodstadt, May 14, 1998); functional contextualism has been proposed as an alternative approach to prevention science in which achieving prevention goals would be a criteria for judging the validity of inquiries (Biglan, 2004); and some prescriptions for advancement of basic sciences have stressed the value of investing in basic research that has societal use – i.e. in the so-called Pasteur's quadrant (Stokes, 1997).

The Society for Prevention Science recently adopted standards of evidence for efficacy, effectiveness, and dissemination (B. R. Flay et al., 2005). While it is encouraging that they have gone substantially beyond traditional prevention science in acknowledging a wide range of evidence, their approach suggests that dissemination science should rest on effectiveness studies and criteria; and these should be based on efficacy studies and criteria. This leaves little hope that the traditional, knowledge-driven, trickle down approach supported by the scientific enterprise would ever generate all of the knowledge necessary to be brought to bear on decisions in the plethora of decision contexts that constitute cancer control and/or prevention practice.

Bate and Robert (2002) have suggested that private sector practices in knowledge management, including the application of a social constructivist communities of practice, may be an anecdote to the naïve application of the positivist approach to evidence-based knowledge and practice which is dominant in the United Kingdom's health service.

Brownson et al. (2006) have suggested that different decision-making processes, clashing cultures, timing issues, ambiguous research findings, difficulty in balancing objectivity and advocacy, information overloads, and mismatching of randomized thinking with non-random problems are inherent in the relationships between policy-makers and scientists. They suggest to close the gap, there is a need to better understand the complexity of decision-making, find ways to engage researchers in policy-making, to ensure that research is properly communicated and well understood, and several specific mechanisms to do this (e.g. systems of policy surveillance, conducting policy-relevant research, better training and education

[45] They also cite the roles of the Canadian Health Services Research Foundation and the Canadian Institutes for Health Research as playing a key role in affecting this transition by expecting and defining knowledge transfer and exchange as key roles for researchers (Denis, Lehoux, & Champagne, 2004).

programs, trans-disciplinary public health teams, cultivation of political champions, and having scientists obliged to not only generate new knowledge, but also ensure that it is applied.

Lomas (2000b) suggests that there is a need to link the communities of researchers and policy-makers in Canada so that they find points of exchange throughout the research and decision-making processes, and that they better understand each others' epistemiologies, ideologies and values, beliefs about causal mechanisms, and interests (including incentive and reward systems that influence these). Such linkages and exchanges are fundamental to the approach of the Canadian Health Services Research Foundation as it seeks to enhance the relevance and use of heath services research (Lomas, 2000a). Further hope arises in Canada due to the NCIC working group's effort to develop and promulgate an alternative vision, i.e. of knowledge integration (National Cancer Institute of Canada, Working Group on Translational Research and Knowledge Integration, June 2005).

Appendix D – Definitions of Knowledge and Related Concepts

Knowledge is a complex concept, a term that most people understand, yet conveys different meanings to various interpreters. Nonaka (1994) has observed, since the time of the Greek philosophers, there has been a never ending search for the meaning of knowledge. Nonaka and Takeuchi (1995) state the western philosophers have agreed generally with Plato's conception that knowledge is "justified true belief" and belief in truth does not constitute true knowledge if there is doubt. Therefore, Nonaka and Takeuchi (1995) consider knowledge to be a "dynamic human process of justifying personal belief toward the 'truth'".

They also make a distinction between knowledge and information (Nonaka, 1994) in which they suggest that: "… information is the flow of messages, while knowledge is created and organized by the very flow of information, anchored on the commitment and beliefs of the holder." As such, it appears that knowledge is seen to be an active and subjective phenomenon and that information flow, including information that contains subjective meanings of the originator is seen to be a source for "justifying truth beliefs" or knowledge (using Nonaka and Takeuchi's conception).

Tacit and explicit aspects need to be distinguished as a key defining characteristic of knowledge. Polyani's book (1983) on this subject is often cited in the business literature as a key source for the distinction between tacit and explicit. He starts with the fact "we know more than we can tell" (p. 4). Generally, knowledge is considered explicit if it is codified or articulated and tacit if it is not formalized and communicated. Tacit knowledge is experiential and not verbal. It is context specific, rooted in experience and is strongly related to action (Nonaka, 1994).

For Polyani (1983), Gestalt is an experience that integrates awareness of aspects of experience without being able to identify with specific aspects and for Polyani the search for knowledge through this process is essential to the expression of creative genius, both scientific and artistic[46]. According to Polyani, knowledge whether tacit or explicit can be of two varieties – *know how* (können to Germans) and *know what* (wissen to Germans) (Polyani, 1983). Both are experienced, are at once intellectual and practical, and coexist together.

Gregory Bateson, an often cited author and originator of ecological concepts applied in organizational learning and action research, discussed his understanding of the relationship between knowledge and experience as follows: "The word "know" is not merely ambiguous in covering both *connaître* (to know through the senses, to recognize or to perceive) and *saviour* (to know in the mind), but varies—actively shifts—in meaning for the basic systemic reasons. That which we know in the senses can *become* knowledge of the mind" (Bateson, 1972).

Knowledge is different than information and other related concepts. Ackoff (1999) makes the distinctions among data, information, knowledge, intelligence, understanding, and wisdom, as follows: "*Data* considers of symbols that represent objects, events, and their properties". "*Information* is contained in descriptions, in answers to how questions that begin with such words as who, what, where, when and how many". "*Knowledge* is contained in instructions. It consists of know-how". "*Intelligence* is the ability to acquire knowledge". "*Understanding* is contained in explanations, answers to "why" questions". "*Wisdom* is the ability to perceive and evaluate the long-run consequences of behaviour" (Ackoff, 1999). According to Ackoff, knowledge is seen therefore to go further than information and is actionable, as contains instructions or information on how to act. It is, in his definition, literally beyond (justified true) belief. The action dimension is clearly important to consider. Wisdom has longer term dimensions.

Weick (2001) suggests that wisdom should be considered an attitude toward one's knowledge and that "Wisdom is a quality of thought that is animated by a dialectic in which the more one knows, the more

[46] "Gestalt… as the outcome of an active shaping of experienced performed in the pursuit of knowledge. This shaping or integrating I hold to be the great and indispensable tacit power by which all knowledge is discovered, and once discovered, is then held to be true. The structure of Gestalt is then to recast into logic of tacit thought, and this changes the range and perspective of the whole subject. The highest forms of integration loom largest now. These are manifested in the tacit power of scientific and artistic genius." (Polyani, 1983)

realizes the extent of what one does not know." (p. 365). Furthermore, he suggests that confidence and over-commitment to knowledge, thereby overly reducing doubt, may not be wise. Ambivalence may be an optimal compromise in some instances, particularly those requiring improvisation due to contextual uncertainty. An attitude that does not fix a commitment to a belief is also one that is open to new information and perhaps may be desirable vis-à-vis integrating new information into one's knowledge.

Little absolute certainty exists in much of science, let alone public health and preventive practice. It may be helpful also to note that prominent social psychologists define various aspects of belief as subjective probability (e.g. outcome expectations in the theory of planned behaviour (Ajzen, 1991; Ajzen, 2002; Ajzen & Fishbein, 2005) and efficacy expectations in social cognitive theory (Bandura, 1986; Bandura, 2000; Bandura, 2001; Bandura, 2004).

Brown and Duguid (Brown & Duguid, 1991; Brown & Duguid, 2001) have observed that explicit knowledge is generally easier transferred within organizations and across organizational boundaries (e.g. to other members of a community of practice) than lived experience, and tacitly held knowledge. (S. D. N. Cook & Brown, 1999) have suggested that explicit knowledge gives shape and discipline to "knowing" and call the reciprocal interplay between knowledge and knowing "bridging epistemologies". Knowing is seen as a process of understanding, and knowledge is seen to be the result.

More recently, Flyvberg (2001) has suggested that the Platonic notion of knowledge is too restrictive and that a fuller analysis needs to move beyond a purely rational order, particularly as this relates to practice. He discusses levels of expert knowledge attained through rational and practice-based experience. He goes on to cite Bourdieu and acknowledges that virtuoso's in living have perfect command of resources, understand the context within which they operate, and produce actions that are appropriate to contexts they are operating in. Flyvbjerg further suggests that we should look to back to Aristole's three intellectual virtues for a fuller understanding of truth and motivations for action or practice. Flyvberg also credits Bourdieu for acknowledging Aristole's virtues as the genesis of his habitus concept (Flyvbjerg, 2001).

To quote Flyvbjerg's (2001; p. 57) summary:

"*Episteme*	Scientific knowledge. Universal, invariable, context-independent. Based on general analytic rationality. The original concept is known today from the terms "epistemology" and "epistemic".
Techne	Craft/art. Pragmatic, variable, context-dependent. Oriented toward production. Based on practical instrumental rationality governed by a conscious goal. The original concept appears today in terms such as "technique", "technical", and "technology".
Phronesis	Ethics. Deliberation about values with reference to praxis. Pragmatic, variable, context-dependent. Oriented toward action. Based on practical value-rationality. The original concept has no analogous contemporary term."

Flyvbjerg (2001) also suggests that power dimensions of action are critically important considerations for action and affecting change in society, citing Michel Foucault (Foucault, 2002).

It has been observed in the literature on knowledge management and application that the human process of knowing is always mediated, situated, provisional, pragmatic, and contested (Blackler, 2002).

Mary Kennedy (Kennedy, 1983; Kennedy, 1984) has discussed the concept of working knowledge and social processes whereby social science evidence is incorporated into it. "Working knowledge is the organized body of knowledge that administrators and policy-makers use spontaneously and routinely in the context of their work. It includes the entire array of beliefs, assumptions, interests, and experiences that influence the behavior of individuals at work. It also includes social science knowledge. … Working knowledge often has greater cumulative influence on policies and practices than does the evidence that is selectively brought to formal decision points." (Kennedy, 1983; pp. 193-194).

Working knowledge is viewed to be more pliable than gestalts, schema, and broader world views that people carry with them. Workers (including policy makers and front line practitioners) are seen to actively, and continuously, but unsystematically searching out and processing new evidence. They then incorporate new information into their beliefs in original or interpreted form – or they may draw inferences by bridging original new evidence with interpretations of it (Kennedy, 1983).

It is suggested that it would be useful to follow Nonaka and Takeuchi's (1995) lead (after Plato). However, one must also make the distinction that Brown and Duguid (1991) have made between knowing as a process and knowledge as a result, and recognize the subjective nature of it. It is also useful to define knowledge for practical purposes (and operationalization in this study) as belief or expectation (Ajzen & Fishbein, 2005; Bandura, 2001). Flyvbjerg's categories of *episteme, techne,* and *phronesis* can be considered subcategories of knowledge. Kennedy's (1983) notion of accessible, pliable, and dynamic knowledge that is spontaneously and routinely employed in work contexts is also useful. It can be applied to distinguish the various sources of knowledge that "might be accessed" from those that are actually in use. A combination of Ackoff's (1999) and Weick's (2001) notions of wisdom as having both long-term dimensions and being associated with an attitude of uncertainty should be considered.

Appendix E – *A Priori* Propositions

The table in this appendix presents a set of propositions (see below, table included in this Appendix). Consistent with the basic model (Figure 1), these relate to information inputs to agents and organizations, working knowledge development, practice integration, the context of the agent and the organization, and general integrative propositions.

The list of 42 hypothetical propositions was developed during a rereading of two comprehensive papers completed by the investigator as requirements for the Ph.D. in Health Studies and Gerontology at the University of Waterloo (Garcia, Unpublished monograph, June 30, 2006; Garcia, Unpublished monograph, March 5, 2006). This generated a list that was then sorted and categorized in Table E1. It should be noted that while several are descriptive in nature, many actually relate to processes and mechanisms that involve relationships among factors, variables, or levels of the broad categories. A brief discussion of these propositions follows, including key references to the major sensitizing concepts associated with each.[47]

Consistent with the discussion of types of knowledge and beliefs (Ajzen, 1991; Ajzen, 2002; Ajzen & Fishbein, 2005; Bandura, 1986; Bandura, 2001; Bandura, 2004; Bateson, 1972; Flyvbjerg, 2001; Nonaka & Takeuchi, 1995; Nonaka et al., 2006; Polyani, 1983; Schön, 1983). TCCs will consider and seek a wide range of information from multiple sources (see list under A.2).

Knowledge use will take multiple forms including instrumental, conceptual, symbolic, and process uses (Cousins & Leithwood, 1986; Cousins, 2003; Amara et al., 2004; Henry & Mark, 2003; Johnson, 1998; Kirkhart, 2000; Landry et al., 2001; Landry et al., 2003; Leviton & Hughes, 1981; Leviton, 2003; Mark & Henry, 2004; Weiss, 1979; Weiss, 1980; Weiss et al., 2005). Learning in public health agencies will take single, double and triple loop forms (Argyris & Schön, 1978; Argyris et al., 1985; Argyris, 2004).

Aspects of social use will be evident, e.g. controversy, argumentation, knowledge creep and decision accretion, developmental evaluation (Chelimsky, 1998; Patton, 1999; Valovirta, 2002; Weiss, 1980; Weiss, 1998). Knowledge is, in summary, situated, mediated, provisional, and contested (Blackler, 2002).

A wide variety of characteristics will be seen as associated with the use (or non-use) of information/evidence – including user background, characteristics of the information transmitted, source of the communication (including but not limited to credibility) and relationships, shared learning and meaning making. Several major reviews provide lists of factors that are relevant to evaluation use (Alkin, 1975; Cousins & Leithwood, 1986; Leviton & Hughes, 1981; Leviton, 2003; Shulha & Cousins, 1997) and these may also apply to other information sources.

Sustained interactivity and long standing trust relationships between researchers and decision-makers will be associated with learning (Huberman & Cox, 1990; Huberman, 1990; Lomas, 2000a; Lomas, 2000b; Manske & Leithwood, Unpublished manuscript; Preskill, 1994; Preskill & Caracelli, 1997; Preskill & Torres, 1999; Preskill, Zuckerman, & Matthews, 2003; Torres & Preskill, 2001; Shulha & Cousins, 1997). Moreover, the personal factors including interpersonal relationships appear important (Patton, 1988; Preskill & Caracelli, 1997; Weiss, 1998). These perhaps will be less prevalent than desirable, but where sustained interactivity occurs greater use of evidence will be seen. Moreover, interactive social construction of a shared vision about what works, what should be implemented, how it should be implemented, roles and responsibilities, and credit and accountabilities are critical to successful execution (Denis et al., 2004; Greenhalgh et al., 2004; Lomas, 2000a; Lomas, 2000b).

[47] It is interesting to note that the original proponents of grounded theory advocated that literature reviews not be completed until after data gathering and analysis were undertaken, so as not to be shackled by previous authors' theories (Glaser & Strauss, 1967). Strauss and Corbin (1998) acknowledge that bringing professional experience and disciplinary literature to an investigation is the norm. Charmaz (2006) quotes Dey that "there is a difference between having an open mind and an empty head (Dey, 1999). She is sympathetic to the view that it is best to articulate ones own views prior to consulting the literature, while recognizing that this may be necessary in certain situations (e.g. grant applications and theses for example).

Communities of practice (Brown & Duguid, 1991; Brown & Duguid, 2001; E. Wenger, 1998; E. Wenger et al., 2002; E. C. Wenger & Snyder, 2001), informal networks (Cummings & van Zee, 2005; Kramer & Cole, 2003; Kramer & Wells, 2005; Tenkasi & Chesmore, 2003; Tenkasi & Hay, 2004; Tsai & Ghoshal, 1998), and hypertext organizations (Nonaka, 1994) facilitate communication and practice changes/maintenance. Communities of practice exhibit habitus (Bourdieu, 1977) characteristics – learning occurs in and through people, forming of system of durable, transposable dispositions.

It is also posited that TCC will have well developed mental models or frames of reference for their work (Walsh, 1995). While well known models and theories in health promotion will be understood (Best, Stokols et al., 2003; Green & Kreuter, 2005; Halfon & Hochstein, 2002; Stokols, 1992), they will not be a primary consideration in daily work of TCC. TCC will embrace a common-sense perspective on reality and organizations will assist them in sense-making (Daft & Weick, 1984; Weick, 2001).

TCC will understand strategy, structure, plan of execution/action and these will be developed through interaction with others. They will see evidence as a key to their decision-making. Knowledge transfer (one way) and knowledge exchange (two way, interactive) communication will occur (Jacobson, Butterill, & Goering, 2004; Jacobson, Butterill, & Goering, 2005; Kramer & Wells, 2005; National Cancer Institute of Canada, Working Group on Translational Research and Knowledge Integration, June 2005; Reimer et al., 2005). Coordination, identity making, and learning (Kogut & Zander, 1996) will all occur in public health departments.

Personal, proximal, and collective efficacy (Bandura, 1986; Bandura, 2000; Bandura, 2001; Bandura, 2004) will be evident and necessary for successful execution of complex strategies. Collective minds will be evident in public health organizations. Individuals will look out for each other and perform work in asynchronous manners, with mutual interests taken into consideration (e.g. prevention system and protection system players supporting each others' efforts) – as has been demonstrated in other work environments (Weick & Roberts, 1993).

Jointly held concerns and shared responsibility will also occur at multiple levels within an organization, demonstrating feedback and feedforward of information to facilitate multi-level performance and learning (Crossan & Hulland, 2002). Systems for organizational learning will be identifiable in public health. These will include knowledge/information acquisition, distribution, interpretation, and memory – and vary across organizations in terms of breadth, elaborateness and thoroughness (Huber, 1991).

TCC themselves will contribute to diffusion of knowledge and practice throughout the department and their external networks. They will employ multifaceted strategies (Bero et al., 1998; Ellis et al., 2003; Ellis et al., 2005; Oxman et al., 1995).

Characteristics of interventions will affect uptake and application. These include such factors as relative advantage, compatibility, and complexity (Berwick, 2003; Greenhalgh et al., 2004; Greenhalgh et al., 2005; Parcel et al., 1995; Rogers, 1983). Misuse will also occur (Alkin & Coyle, 1988; Christie & Alkin, 1999; Cousins, 2004).

Organizational knowledge conversion will occur through socialization, externalization, combination, and internalization – involving a dynamic process with tacit and explicit aspects (Nonaka & Takeuchi, 1995). Context matters and cultural aspects that facilitate or frustrate each form of knowledge conversion (i.e. ba) will occur in public health systems (Nonaka & Konno, 1998; Nonaka et al., 2000; Nonaka et al., 2001). Evidence of learning at individual, group, organization, and industry/public health system wide level will also be seen (Argyris & Schön, 1978; Argyris et al., 1985; (Fiol & Lyles, 1985). As well organizational routines – i.e. "multi-actor, interlocking, reciprocally triggered sequences of action" (M. D. Cohen & Bacdayan, 1994) will be observed.

Organizations will also support sanctioned (canonical) practices whereas communities of practice will foster non-canonical practices as well (Brown & Duguid, 1991). Therefore, communities of practice may be more efficient sources for innovation and dissemination of new practices (Wenger et al., 2002).

Various organizational factors may be associated with productive learning in public health systems. These may include structure – specifically organizational learning mechanisms, culture, psychological safety and organizational commitments, and contextual factors (Ben-Horin Naot, Lipshitz, & Popper, 2004; Friedman et al., 2005; Lipshitz et al., 1996; Lipshitz & Popper, 2000; Lipshitz, 2000; Lipshitz et al., 2002; Lipshitz et al., 2007; Popper & Lipshitz, 1998; Popper & Lipshitz, 2000).

Moreover, both hardware (structures) and software (culture/values/relationships) are essential (Riley et al., 2001; Riley et al., 2003) in multilevel structures and more macro structures can prevent successful execution of strategies at lower levels – e.g. policy commitments (McLean et al., 2005).

There are also limits on public health organizational learning, particularly when the organization is under stress of environmental demands and constraints of resources; external tensions due to imperfect environmental matches (e.g. in a tobacco belt, inter-organizational turmoil); and degree of organizational slack affect adaptation and learning abilities of public health systems. Mechanisms other than remuneration/payment to staff foster learning and action beyond what is included in contracts and job descriptions (Cyert & March, 1992).

Major action systems within tobacco control will also be discernable with clear actors, ends, means, integrative mechanisms and contexts (sometime characterized by adaptation, goals attainment, integration, and latency dimensions) as developed in Parsonian action systems (Casey, 2005; Champagne et al., 2004; Parsons, 1937a; Parsons, 1937b) . In addition, following Beer's viable system model in organizational cybernetics (Beer, 1981; Beer, 1984), there will be implementation, coordination, operational control, development, and policy systems identified in public health organizations (M. J. Jackson, 2005).

Program cycles and related decision-making times and sequences will also be evident, and different sources of information will be necessary at different points in the implementation cycle (Dobrow, Goel, & Upshur, 2004). It is likely that these will orient to annual operational planning cycles and longer term provincial and municipal election cycles. History and tradition will matter and time/space dimensions will affect routinization of knowledge and practices (Giddens, 1984).

Last, public health systems and the role of TCC will be seen to exist with integrated systems shaped by triadic reciprocity (Bandura, 1986), duality of structure and support structuration theory (Giddens, 1984), within a habitus operating environment – i.e. as a durably installed generative mechanisms, based on history and experience, providing a basis for virtuoso practice to be learned, sustained, and perpetuated (Bourdieu, 1977).

Furthermore, depending on the time dimension of the action system to be used in analyses, it will be possible to consider the development of roles from a micro ethno-methodological radical empiricist perspective for practice in the moment (Warfield Rawls, 2006) or philosophical hermeneutic perspective for practice in historical context (Gadamer, 2004a; Gadamer, 2004b). Last, all intellectual virtues will be seen to be in operation with a context of power dynamics per Flyvbjerg following Aristotle and Foucault (Flyvbjerg, 2001).

Table E1 – *A Priori* Propositions

A. Information inputs to the agents and organizations

1. Preparation for learning

- Tobacco control coordinators (TCC) need to consider a wide range of information when developing decisions about direction for the programs.

2. Types of information received and or sought

- TCC will seek and are informed by many sources of information. These include:
  - Scientific literature, including published studies and systematic reviews;
  - Exploration/discovery and exploitation/borrowing-diffusion of innovation;
  - Community/population health assessments (burden and its distribution in populations);
  - Surveillance of population health indicators (e.g. smoking prevalence by age, sex, cultural group, geographic area/neighbourhood over time and space);
  - Service monitoring information (e.g. resources, activities, outputs of programs delivered);
  - Evaluative research – developmental evaluation (e.g. logic model construction and building evaluation into programs), process (engaging clients and stakeholders in determining questions, data gathering tools etc.) and products of evaluations (reports, presentations, and other communications);
  - Practical guidance about public health practice in the form of technical assistance and training (e.g. techniques of health education, community organization, social marketing, media advocacy etc.);
  - Continuing professional development, including participation in practice and professional organizations and networks, communities of practice, conferences and trainings (i.e. internal or external to the organization);
  - Reflective professional practice (i.e. reflection while taking action [thinking on your feet] and subsequently as post hoc interpretation);
  - Accountabilities, imperatives, and obligations – expectations of others for execution of certain actions/duties, including legally mandated responsibilities, performance contracts and role expectations; and,
  - History and tradition.

B. Working knowledge development by agents and organizations

1. Definitions and descriptive aspects

- The use of new knowledge by TCC in public health settings is a complex phenomenon. It includes instrumental, conceptual, symbolic, and process dimensions which vary over time.

- There are multiple types of learning (single, double, triple loop) that occur in public health settings and TCC participate in all of these.

- Knowledge is situated, mediated, provisional, pragmatic, and contested.

- A plethora of factors affect use. These include but are not limited to the following:
  - user and types of use (including but not limited to decision-maker and decision characteristics);
  - characteristics of the information/evaluation itself;
  - evaluator/scientist/other information provider;
  - organizational (internal) and environmental (external) contextual factors; and,
  - interpersonal and interaction characteristics.

2. Social construction of working knowledge

- Knowledge integration, sustained interactivity of researchers, and shared meaning-making occur within public health organizations, but less frequently than short-term, one-way and limited two-way interactions.

- When sustained interactivity does occur (such as in the case of ongoing technical assistance, participatory evaluation, and internal research/evaluation), it is more likely that empirical research (science and/or in situ studies) will affect working knowledge and decisions by tobacco control coordinators.

- TCC have well developed ideas and are able to identify mental models about how change occurs within their organization and community.

- The perception of characteristics/attributes of interventions affect how they are incorporated into working knowledge and these factors (relative advantage, compatibility, and complexity) affect how they are incorporated into working knowledge and subsequently implemented in systems.

- Interactive social construction of a shared vision (about what works, what should be implemented, how it should be implemented, roles and responsibilities, and credit and accountabilities) is critical to successful execution. TCC will understand strategy, structure, plan of execution/action and these will be developed through interaction with others.

- Communities of practice and informal networks (and hypertext organizations) facilitate communication and practice changes/maintenance. Communities of practice exhibit habitus characteristics – learning occurs in and through people, forming of system of durable, transposable dispositions.

3. General processing of working knowledge

- Public health professionals working as TCC in Ontario see evidence-informed practice as a key aspect of their roles.

- With respect to both scientific and practical knowledge, both one-way (push/pull) and two-way communication (interactive) occur in public health. Both affect working knowledge. Moreover, both knowledge translation (including research translation) and knowledge exchange occur. The later may include working together on joint time-limited projects, or over the longer term, to develop an organization and/or strategy.

- Coordination, identity-making and learning all occur within public health organizations. This occurs within defined action systems across an organization (specialization determines a learning dynamic) and among socially proximal (regional) and similar action systems (e.g. inspectors in a region).

- Collective, proxy and personal efficacy aspects all exist in public health and are understood to be essential to collective impact on population health problems, including tobacco use reduction.

- Basic theories suggested as fundamental for public health promotion will be understood, although the application of these in the design of public health interventions will be seldom reported.

- TCC embrace a common-sense realist perspective. They believe that there is a real world out there, and that they as agents of public health change can affect the life worlds of the population and reduce disease burden.

- Misuse of information occurs. "Interpretations" of "facts" factors into working knowledge, not objective findings. It can be misused in many ways, including mistaken use, mischievous use, and suppression of and/or ignoring findings/facts.

C. Practice integration by agents and organizations

1. Role as a promoter of "effective" practices

- TCC themselves engage in multifaceted strategies to promote the adoption, implementation and maintenance of programs.

- TCC will exhibit (more or less) systems-oriented knowledge broker roles – e.g. systems thinking, cybernetics, and social construction roles (e.g. vision articulation/conveying and communication related to mental models). As such, they play a key role in interpreting government and organizational policy and the role of interventions, individuals and groups within it.

2. Change processes employed by agents

- Periodic episodes of major program change triggered by provincial policy shifts create opportunities for major institutional shifts in programming. However, decisions and changes in programs generally occur through gradual processes of knowledge accumulation and decision accretion. There are multiple actors with multiple action systems throughout organizations and communities, and each need to be affected.

- Organizational knowledge conversion occurs through socialization, externalization, combination, and internalization processes that require interaction between actors involving tacit and explicated modes of communication. SECI mechanisms of conversion will exist in public health. Certain micro-contextual factors contribute to successful conversion.

3. Learning as a change process in public health

- Evidence of learning of various kinds at individual, (primary reference) group, organizational, community inter-organizational levels can be identified in public health agencies. These include single, double and triple loop learning; exploration and exploitation; information and knowledge acquisition, distribution, interpretation, and memory (integration and institutionalization as well); hardware and software aspects; collective mind; etc.

- Organizational routines as "multi-actor, interlocking, reciprocally triggered sequences of action" involving multiple levels and interaction within and outside of the public health agency will be observed.

- Organizations will support formal canonical practice. Communities of practice will support both canonical practice and non-canonical practice, and are hence both a source of innovation and dissemination.

D. Context of the agent and organization

1. Factors external to the organization

- External organizations transfer knowledge products (or information) into public health organizations that must be processed and this may be a challenge to the status quo or serve to preserve it. These new or evolving concepts may enter the organization at any level through any member.

- Social and political aspects affect the social construction of working knowledge. These include argumentation, debate, advocacy, tobacco industry rhetoric, law suits, media coverage, freedom of information requests, etc.

2. Factors at the organizational level

- Public health organizations, as multilevel systems, have various facets that either facilitate or impede the adoption, implementation, and routinization of interventions. These include:
  - Structure and organizational learning mechanisms;
  - Culture – transparency, integrity, issue orientation, inquiry and accountability;
  - Psychological safety and organizational commitment;
  - Policy – tolerance of error, commitment to learning, and commitment to workforce;
  - Contextual aspects – error criticality, environmental uncertainty, task structure, proximity to core mission, committed leadership; and
  - These relate to Lipshitz et al's model.

- There are real limits on public health organizational learning, particularly when under stress with multiple competing priorities (real bounds on rationality).

- There are tensions between public health organizational roles and community context (imperfect environmental match, e.g. tobacco belt, Windsor). These may be creative or destructive.

- Public health agencies, like firms, are also coalitions of interests (e.g. drawn along professional lines), that take advantage of or reject change. Mechanisms other than payment can be motivators for assumption of new roles (e.g. decision latitude and freedom) and keeping the organization functioning.

- Organizational slack is a factor positively related to public health organizations' ability to adapt, i.e. ability to take on new initiatives and respond to environmental opportunities and threats (behavioral theory of a firm).

3. Multilevel and multifaceted nature of public health agencies and the tobacco strategy

- TCC work in multi-level organizational structures. Multi-level (individual, group, organizational, industry-wide) patterns of practice will be well understood by TCC.

- A key aspect of organizational change is capacity building. Capacity building and structures for learning are important. Organizational values and supportive context are critical to success. Both "hardware" and "software", distributed to all levels, is necessary.

- Collective minds exist in organizations. Individuals who share common cause will look out and perform work in asynchronous manners, with mutual interest in mind, and this will happen in certain interfaces among action systems (e.g. school prevention and protection). Feed forward and feed back are exhibited in organizations to facilitated shared meaning, role coordination, and program integration.

- Structures for knowledge acquisition, information distribution, information interpretation, and organizational memory can be seen throughout public health organizations and these will vary in terms of breadth, elaborateness, and thoroughness. Some are declared and others are encoded in procedures within the various functions of the organization and are therefore less obvious.

- Major action systems in public health can be clearly identified on the basis of Parsonian AGIL (adaptation, goal attainment, integration, and latency) dimensions. These will relate to the major aspects of Beers viable system model.

4. Program cycles and timing for learning

- Each program and related planning and decision-making processes (e.g. major decisions, program changes, and adjustments/refinements) have a predictable cycle of activity. Different sources of information are useful at difference stages in the process, in both the lifecycles and annual cycles of interventions.

- Predictable program cycles relate both to annual operational planning cycles and broader provincial and municipal (and to a lesser extent federal) election cycles.

5. General aspects

- History and tradition matter. Practice trajectories are determined over time, and are difficult to change. This may be interpreted pessimistically about potential for change process or optimistically about sustainability once changes are integrated into a new or evolved practice patterns.

E. Integrative propositions

- Public health systems and the role of TCC within them will provide general support for triadic reciprocity, morphogenic, and habitus theories (per Bandura, Archer and Bourdieu respectively); can be interpreted from both a radical empiricist and philosophical hermeneutical perspective (per Garfinkel and Gadamer respectively); and, be seen to address all intellectual virtues within dynamics of "power" relations/structures (per Flyvbjerg following Aristotle and Foucault).

Appendix F – Qualitative Interview Guide

A. Opening remarks and discussion about the purposes and benefits of the study

- Introduce self and present an overview of the study.
- Describe the benefits for program development, as well as theory and methods.
- Describe how various projects have come together to do this is a practical manner and to minimize as much a possible the burden on TCCs – but they are key players in the system and it is important to understand how they then use information and knowledge in their jobs
- Be explicit that the data will be used to (a) assist with planning for technical assistance and training program development, through the Program Training and Consultation Centre, Technical Assistance and Training Task Group of the Community Action Working Group, and the Ontario Tobacco Research Unit; and (b) as a source of data for the principal investigator's Ph.D.
- Stress that the interviewer has very few expectations at the outset about what might be said. The study is based substantially on the views of the respondents. Their insights and recollections therefore are critically important. They should not in anyway think that the interviewer knows their reality. However, he definitely needs to know it like it is and ask for candor and forthrightness. There are no correct or incorrect answers – only the important perspectives and views of the study participants.
- Stress that the interviews is confidential, ask for permission to tape record, explain that the interview will be tape recorded and then destroyed, explain interest in use of "non-attributed quotations", and that the interview and the identifying information will be stored in completely separate locations, and destroyed after 2 years.
- Provide and/or receive completed consent form.
- Ask if the interviewee has any questions, answer them, thank them for their time and begin.

B. Open-ended questions[48]

I would like to ask you some general questions at the beginning. And, we'll just see where the interview goes. Later on, depending on what we cover in the general questions, I might ask some more specific questions. Is that OK with you?

Remember, there are no right or wrong answers. I just really want to know your perspective and if you are able to provide me with some specific examples as we go, and reflect about why things are the way they are, that would really help.

<u>Roles, responsibilities and relationships</u>

OK, let's begin. The first question is about roles, responsibilities and relationship in tobacco control here in (name of the public health unit)

1. Will you please tell me about your role? What is your job as related to the tobacco control strategy here in (public health unit)?

2. It would be helpful for me to know about whom you work and what you do, in a bit more detail. Will you please tell me more about who do you work with? On what? And, why?

3. To me, this is really interesting. It is a pretty complex role then, an interesting experience.

   I really do want to understand your practice and your practice environment here in (public health unit). As this study is about the role of tobacco control workers in public health agencies, what do I need to know? Please tell me.

[48] Note: Statements that may be made as directing attention to new areas of questioning are in *italics*. Questions are in regular font.

NOTE TO THE INTERVIEWER: FOLLOW THE INTERVIEWEE. ASK FROM HERE ON ABOUT SPECIFIC EXAMPLES AND ASK GENERAL QUESTIONS: WHY, HOW, WHO, WHAT, WHERE.

LET THE CONVERSATION OPEN UP ON ITS OWN, LISTEN ACTIVELY AND TRY TO COVER THE AREAS THAT THE QUESTIONS BELOW WOULD HAVE GONE THROUGH SYSTEMATICALLY. USE THE QUESTIONS BELOW, ONLY AS NEEDED TO AT THE END OF THE INTERVIEW IN NEEDED TO DEAL WITH VARIOUS SENSITIZING CONCEPTS AND ISSUES.

B. Semi-structured questions – AS NEEDED ONLY

Sources of information in public health decision-making

The next question has to do with what sorts of information you use in your decision-making generally in this public health unit as it pertains to tobacco control.

4. What factors into your decision-making about programs and policy here in the health department and the organizations that you work with? Can you tell what information you use and why?

Probe only if needed. Now I would like to explore specific kinds of information.

5. What kinds of information are relevant to your decisions – i.e. either your decisions directly or the sorts of decisions taken about tobacco control by this public health agency?

6. I'm going to read you a list. Will you please tell me about what roles each of these play in public health agency decisions, and if so, how the following are relevant? Examples are of particular interest.

   What about:

   - Empirical evidence
     - Scientific literature, including published studies and systematic reviews?
     - Community/population health assessments (e.g. disease burden and distribution in the community)?
     - Surveillance of population health indicators (e.g. smoking prevalence by age, sex, cultural group, geographic area/public health unit over time and space)?
     - Service monitoring information (e.g. resources, activities, outputs of programs delivered)?
     - Evaluative research – developmental evaluation (e.g. logic model construction), process (engaging clients and stakeholders in determining questions, data gathering tools etc.) and products of evaluations (reports, presentations, and other communications)?
     - Other kinds of evidence?
   - Technical assistance, training, and reflective practice

- Practical guidance about public health practice aspects in the form of technical assistance and training (e.g. techniques of health education, community organization, social marketing, media advocacy etc.)?

- Continuing professional development, including participation in practice and professional organizations and networks, and conferences (i.e. internal or external to the organization)?

- Reflective professional practice (i.e. reflection while taking action [thinking on your feet] and subsequently as post hoc interpretation)?

❖ Background information

- Accountabilities, imperatives, and obligations – expectations of others for your execution of certain actions/duties, including legally mandated responsibilities, performance contracts and role expectations?

- History and tradition, including your local history and tradition?

- Resourcing levels – human resources, funds for programming and so on?

- Information that comes from direct encounters with your clients and people serviced by this agency?

Probe as needed the following two areas:

- What about values, ethics and doing the right thing? Where does information about these things come from?

- What about the tobacco industry, health advocates, other pressure and interest groups, and the media?

4. What sources of information are most important to you and this department? why?

- Probe if necessary – Is scientific information relevant? Why? Or Why not?

<u>Processing/using information and evidence</u>

Now a few questions are about how you and this public health agency go about using empirical evidence and other types of information? What I mean is to do now is turn our attention towards the actual processing of information that we just talked about.

We know that this is a complex process and there are many factors that come to play when you are trying to advance tobacco control here in your agency.

5. How is information used in this public health agency?

6. Will you describe for me how information comes into the department and what happens to it?

Probe on four kinds of social science use:

Does it get turned directly into decisions and major program or policy change? Please provide some examples

Does it get used to educate or inform department staff? Do you you have some examples?

Does it get used to justify what you're doing now? Again, any examples?

Does it affect the way people think and practice tobacco control? How?

Converting knowledge, learning in the organization, and organizational learning

I would like now to discuss learning: learning as it occurs within this public health agency, by yourself and others -- as well as any learning that might be occuring at an organizational level..

Knowledge is sometimes thought to have explicit aspects – such as statements of facts and evidence. It also has implicit aspects – such as learning what is expected on the job, through experience and interaction with colleagues and the like.

There is a model in the business literature that talks about four kinds of "knowledge conversion" – a sort of four fold table if you will, converting knowledge from tacit to tacit, tacit to explicit, explicit to explicit, and explicit to implicit. Show the interviewee the four fold table.

The conversion from tacit to tacit is really like learning on the job and is about shared experiences of socialization.

The taking of experiential knowledge and converting it into explicit knowledge is known as externalization. This involves the use of metaphors, analogies, and other descriptions.

The conversion of explicit to explicit is sort of like the analysis and synthesis of existing information and evidence – and this is called combination.

And last but not least, is the conversion of explicit information into action by people and learning by applying. I would like to explore these now with you. OK?

7. Would you please describe for me how, in this public health agency, people learn from their own experience and share this explicitly with others? It is anyone's job to help with this process? Are there social processes used? Please describe how this is done here and provide examples.

8. How do staffs take existing explicit information and combine it? Is it anyone's job to assist with this? Are there social processes used? Please describe and provide examples.

9. And, last but not least, what is the process that you – in this agency – use to convert explicit information and knowledge into programs and policy? Is it anyone's job to assist with this translation? Are there social processes involved? How does this happen here in this agency and with partners?

10. What aspects of your organization either hinder or help with these learning processes?

    IF NEEDED ONLY.

    I want to prompt responses in a number of areas. What about:

    - Your organizations' operating environment?
    - Policies?
    - Tolerance of error?
    - Commitment to learning?
    - Commitment to workforce?

- Leadership?
- Organizational commitment to learning?
- Culture? (transparency and openness, integrity, inquiry, accountability etc.)

  Probe: What aspects of the culture and structure of this organization are most important in terms of learning and improvement of tobacco control?

I am also wondering about at the public health agency level, i.e. at the level of the department.

11. Does your agency monitor is environment and make adjustments to tobacco control programs and policy? Would you please describe how this happens?

12. If so, are these fundamental adjustments or tinkering? Please describe examples of major changes, minor changes or anything that you think is significant in terms of learning and adaptation in response to changes in this agency's environment.

13. Could you describe some of the processes that go on within this department as a whole and how you contribute to organizational learning – i.e. if you do? I'd like to probe on a few things. Please describe the following and give any examples to elaborate on how it is done here.

    Continuing education?
    Team planning?
    Records review?
    Review of organizational routines?
    Evaluation and monitoring?
    Audits?
    Reflection on practice?
    Other?

For a moment, please think about tobacco control interventions that you have introduced here in your department.

14. What are the characteristics of interventions that are most easily adopted? Also, what factors affect how new interventions are developed or introduced in your work environments?

Now, just a few last questions about areas of tobacco control in this agency, communities of practice, and how tobacco control will be sustained.

15. Will you tell me please: what are the major areas of tobacco control activity/action in your department?

    Who's involved?
    What are they trying to achieve?
    How do they operate?

16. Do you or others in this department and the coalitions that you work with participate in communities of practice?

17. What are communities of practice anyway?

18. Does your agency support communities of practice? How do they work? Do people learn in them? What do they learn? Can you give some examples? Any other benefits of communities of practice that you can think of?

19. What are you doing to ensure that your tobacco control efforts are sustainable?

20. About cycles of activity:

- Is there anything that happens that you think is now just taken for granted? Are there clear, recurring cycles that give some sense of what to expect? Are there annual cycles? Longer term cycles that you are learning to predict?

- Can you see any predictability in the patterns of your work in the department over the years or the course of election cycles? Is so, what is the pattern? What is predictable?

There is really only one more question that I have, perhaps the most important.

21. What support do think would be most helpful from other levels of the system (regional, provincial, national) to assist you with better enabling and implementing evidence-informed practice here in your public health unit?

Open conversation

- Are there any additional insights that you wish to share about your job?

- Are there issues that I should have asked in this interview but did not? That is, what should been asked by wasn't?

Closing

- Thanks for the interview. Thanks kindly for your candor and time.

- Would you mind if I call you if I have additional questions or need your advice?

- AGAIN, thank you for your time.

- TURN OFF TAPE RECORDER and leave.

Appendix G –
Crude Saturation Analysis: Free Nodes,
Public Health Agencies, and Number of Interviews Identifying
Concepts During the Initial Analysis (Phase 1)

Free Nodes – Initial Coding	Urban (TCAN/PHRED) PHA	Innovative (Mixed Urban/Rural) PHA	Other (Rural) PHA
Adapting and contextualizing	4	4	3
Audits and accreditation	2	2	2
Best practices, guidelines and systematic reviews	4	4	3
Burn out	0	0	1
Capacities and competencies	4	4	3
Cash flow	0	0	1
CAWG and Subcommittee	2	0	1
Communities of Practice and Networks	4	3	3
Community responsive	4	0	0
Cultural sensitivity and competence	4	2	2
Cutting edge issues	4	2	3
Cycles	3	2	3
Equity	2	3	1
Error tolerance	1	2	1
Evaluative research	4	4	2
Externalization	3	1	2
Federal involvement	3	3	3
Geographical context	4	4	3
Health assessment	3	3	2
Health Care Sector Organizations	1	3	2
History	4	4	3
Imperatives and obligations	3	4	3
Innovative grant	0	1	2
Interview process and questions	0	1	2
Job mobility and staff turnover	3	4	1
Job security	1	2	0
Leadership	4	4	3
Library or resource centre	3	2	1
Mandatory Health Programs and Services Guidelines	2	3	1
Ministry of Health Promotion	4	4	2
Organizational changes and development	4	4	3
Organizational culture	4	3	3

Organizational planning	4	3	2
Organizational values	3	3	1
Other public health issues	4	3	2
Performance, quality improvement and accountability	4	3	2
Politics	4	4	3
Population health orientation	4	3	3
Positions and roles	4	4	3
Priority populations, targets, audiences	4	2	3
Protocols and instructions	2	0	1
Resource availability	4	4	2
Scientific literature	3	2	3
Social construction of knowledge	4	4	3
Social determinants of health	1	1	1
Surveillance and monitoring	1	4	2
Sustainability	3	1	2
TCAN and subcommittees	3	2	3
Theories of action	4	3	3
Tobacco Free Councils and Inter-agencies	2	2	1
Training and Technical Assistance	4	4	3
Under-staffing	0	0	1
Union or bargaining unit	2	4	1
University Relationships	2	4	2
Voluntary sector organizations and other community partners	2	3	2
Wisdom	1	0	0
Working knowledge, knowledge conversion	1	3	1
Youth Action Alliances	2	4	3

Appendix H – Thick Case Descriptions Used for Purposes of Member Checks
(Modified To Take Account of Feedback Provided by Members)

1. Tobacco Control Action System in a Large Urban Centre

This public health agency (PHA[49]) has a long history and demonstrated leadership in many aspects of tobacco control, chronic disease prevention, health promotion and protection and public health generally. Furthermore, its recent history is very complex due to a provincially imposed amalgamation of municipalities in the late-1990s.

In fact, the current public health unit (PHU[50]) is comprised of the areas and populations of six previously existing public health units. According to Statistics Canada, the PHU contains more that one million people and has slightly increased in size since 2001. The land area is less than 1000 square kilometers and 100 percent of the population lives in a city or town. The population density is more than 1500 per square kilometer.

The prevalence of smoking in a vehicle when a child is present and current smoking prevalence (age 12 + years) is lower than the provincial average. There was a decline in smoking prevalence of more than three percent between 2000/01 and 2005.

A. Organizational aspects

1. Capacities and competencies

There is an elaborate management structure within the PHA as a whole, owing in large part to the complexity and size of the organization and the population that it serves. The tobacco control program structure is therefore complex as well. However, at the senior levels, there is a clear understanding of roles and responsibilities, while at the same time (at least at the time of interviews) the structure was in some flux. The changes that were imminent resulted from a wide recognition within the PHA that the program has evolved through a series of growth and staffing changes, and that it was time to re-establish its organization in order to be efficient and effective in moving onto its future mandate. Its staff participated substantially in provincial level changes in tobacco control policy, both in an advisory capacity and through the secondment of staff.

There are about 26 full time equivalents (FTE) staff funded under the Smoke-Free Ontario (SFO) strategy and less than 250 FTE positions have been funded under the mandatory chronic disease prevention program cost shared with the Province of Ontario pursuant to the *Health Protection and Promotion Act* (HPPA). There are 20 tobacco enforcement officers.

The current program is organized into a multilevel, multi-disciplinary structure, under the directorship of the director responsible for chronic disease prevention, who is ultimately accountable to the medical officer of health and through him/her to the board of health, community and Ministry of Health and Long-term

[49] Public health agencies are defined as the organization responsible to the local medical officer of health, which in turn is accountable to the board of health, community and Ministry of Health and Long-term Care for the management of all aspects of public health unit operations (cf. (Association of Local Public Health Agencies, 2004)

[50] Public health units are the geographic units including the resident population and physical geographic area within which the boards of health and respective medical officers of health and PHAs are responsible for the delivery of public health programs under various provincial and local mandates, including but not limited to the Mandatory Health Programs and Services Guidelines Pursuant to the *Health Protection and Promotion Act, 1984* and subsequent revisions.

Care (MOHLTC). This has been the case since municipal amalgamation, although the role of the director has shifted over time.

Currently, there are four managers that have responsibility for overseeing the implementation of various aspects of tobacco control: enforcement of the *Smoke-Free Ontario Act* (SFOA) and local bylaw, the Tobacco Control Area Network (TCAN), and two for prevention and cessation-related interventions. As the PHU population and service expectation is so large, there is a need for a separate TCAN for this PHU. Furthermore, as a large PHA, there is a wide variety of system specific functions and interfaces to be managed. These include but are not limited to healthy environments and other mandatory programs beyond chronic disease prevention (e.g. community-based interventions for high need populations, healthy babies/children, setting specific interventions such as school community-based programs etc.). There are 20 dedicated FTE tobacco enforcement officers accountable to the enforcement manager and over 50 FTEs accountable to other managers for prevention, cessation, and general tobacco control planning work – i.e. not counting chronic disease, healthy babies/healthy children, and other staff involved in some aspect of tobacco control work.

As an organization, it has long developed its tobacco control programming within and across disciplinary lines and is working towards a more integrated approach. Furthermore, the PHA has had longstanding working relationships within the PHU and with neighboring PHAs. These extend to other municipal departments, provincial and federal governments, non-governmental organizations, business, community associations, ethnic communities, labor organizations, and many others. The development of the TCAN planning infrastructure within the PHU is seen as a mechanism to further expand partnership arrangements within SFO, with other TCANs, PHUs and other organizations concerned about tobacco control.

In addition to program areas of responsibility, the PHA has a well developed set of central programs and services that support planning and operationalization of public health interventions throughout the PHA structure and in communities. These include but are not limited to policy and planning support, health information and surveillance (e.g. Rapid Risk Factor Surveillance, morbidity and mortality rates etc.), evaluation, professional development (e.g. nursing practice), leadership development, library services, financial management, etc.

The PHA has set out half a dozen strategic directions in its strategic plan, and these are a source of orientation for all departmental activities. These include: improving health in the PHAs diverse population by providing services that are responsive to the community; to be a champion for public health; to anticipate, prevent, and effectively respond to emergencies in public health; to work toward integrated health and social systems; to be innovative and effective; and be a workplace of choice.

Cultural sensitivity and competence are seen as important capacities of the PHA. There is an interest in being sensitive to needs of diverse populations, target programs to meet specific cultural groups needs (e.g. Tamil, gay populations), and to reach communities in their own environments (neighborhoods, schools, places of worship, community recreation settings etc.). There is recognition that there is a need to work with and within communities so that they may develop their own community-based knowledge and capacities to address problems on their own terms, and there are many examples that can be pointed to (e.g. working with south-east Asian women, gay and lesbian communities, Somali communities, Korean businesses etc.).

The PHA, under the leadership of the director of chronic disease prevention and tobacco control program managers, has worked hard to develop from a diffused system of accountability to a system that is coordinated and understood structurally and functionally across the entire department. The developments in tobacco control, which is seen to be a relatively mature program area, have served as a model for the development of an integrated approach to chronic disease prevention. Regionally based directors and managers who assume responsibility for execution of interventions are now centrally engaged in planning and are collectively responsible to ensure the highest quality and farthest reaching interventions possible within limited resources. Working together to identify shared interests in tobacco control, and now in chronic disease, has served the PHA to bring together six different organizations to have a common purpose and share accountabilities.

The PHA, as a large public health organization in a large urban area, is also networked with other PHA across Ontario and Canada (e.g. Urban Public Health Network). Furthermore, its professionals are actively engaged in professional networks (e.g. Canadian Institute of Public Health Inspectors, Community Health Nursing) and interdisciplinary organizations (such as Ontario, Canadian and American Public Health Associations).

The PHA was a key organization in the control of the SARS (Severe Acute Respiratory Syndrome) crisis – demonstrating its ability to bring a large and complex department together for a rapid response needed at that time. As one interviewee noted "2002 was a bit of a wash … pretty much everything and anything was about SARS". Nevertheless, this set a stage for new changes by building an *esprit de corps* within the PHA. Pulling together in a time of need created a sense of team, and "helped wrestle demons to the ground" to the point that the organization is better able to shape its own culture. Furthermore, the "surge capacity" of the organization was demonstrated in response to this crisis.

2. Organizational culture

Organizational culture within this PHA is very much a product of the amalgamation of the PHU municipalities almost 10 years previously. The previous PHAs each had their own particular organizational culture and own ways of approaching public health issues. The new culture, emerging from the previous six, has been an ongoing process. There are different views about how this has emerged – as a single dominant culture of one PHA that apparently has had a greater influence on the organizational culture over all or a blending and melding of all six. However, senior management articulated that they felt that sufficient time had passed and experience had developed together that finally the PHA is developing a single overriding culture (based on all six prior PHA/PHUs). This is apparently developing still. In the next year or so, the PHA will celebrate some major long term milestones in the development of public health within the new PHU and the 10 years since amalgamation.

It was further noted that while senior managers are more likely to have historical connections and memory with prior structures and cultures, this was not the case with new staff and it is the new staff that are generally at the frontline.

There are a number of cultural values, which have already been articulated above in the form of a strategic plan. Several prominent values of the PHA include: client/population service orientation; being responsive to the community (seen by some to be potentially contradictory to a population health orientation); equity in health outcomes and accessible services; concern about broad social determinants of health (housing, income, education level, occupation, culture etc.); leadership among public health organizations in Canada and North America; continuous quality improvement; evidence-based or at least evidence-informed decision-making; accountability; healthy public policy (macro systems, beyond health care) and approaches tailored to unique needs (lifecycle, culture, life circumstances including homelessness); integrated and coherent plans and implementation approaches (e.g. integrated chronic disease prevention); excellence in professional practice (e.g. nursing practice, excellence in enforcement approach, including consistency and integrity); linkages to other levels through appropriate linkages (e.g. OPHA and CPHA); community right to know; participative and open democracy; community coalitions; partnerships; innovation; valuing the PHA workforce; and learning and development.

There is also recognition that all levels of the PHA are necessary for an effective organizational response and execution of plans to address public health issues. There is a need for frontline input (e.g. frontline staff input into design of strategies) and for systematic department-wide strategies and efficient execution. Hierarchy and heterarchy are both seen to be needed.

Error is often tolerated if it is coupled with learning (and post episode debriefing is common in infectious disease control). There is tolerance of discordance/disharmony with outside organizations. Politics is seen to be inherent in the policy development process – and there is a commitment to democratic processes, even though on occasion it can be difficult and sometimes costly, and slow the policy development process down.

Interestingly, within the PHA, there is a sense that planning is expected. However, some feel that it may not be appropriately valued, as there is a sense that time spent planning is actually taking time away from action. There is apparent cultural pressure to shift toward action as soon as possible.

3. Organizational changes and developments

As noted above, the PHA has been long undergoing organizational changes and developments required as a result of a provincially mandated amalgamation in the late 1990s of six distinctly different PHAs in six separate PHUs. The tobacco control program has had to make adjustments throughout the period.

Under the leadership of the director of chronic disease prevention, tobacco was a priority since the amalgamation. Although, at that time, tobacco enforcement was not the responsibilities of the director and it is closely coordinated with the chronic disease prevention initiative. Tobacco enforcement is still under another director responsible for healthy environments.

In the early days, responsibility for tobacco control planning was vested in regional director. However, the accountability was much diffused with some 42 points of accountability identifiable within the system of management. Tobacco control, like other areas of mandatory work, was fully matrixed with regional managers taking responsibility for leadership and being accountable for program delivery. There was good cooperation across the department, and a tobacco control strategy group was formed. This provided a forum for planning and evaluation, developing clear understanding of goals and objectives and then implementation occurred through a "cascading out" through the regional management structure to the staff ranks. There were regular meetings for problem solving and status checking, and structures and mechanisms for reporting and meeting management (e.g. regular reports, agenda, discussion etc.) were put in place. The group developed a strong sense of cohesion, helped make sense of difficult situations, and developed a system of knowledge/experience sharing and collaboration. Some of this was based on prior strong working relationships and sharing that occurred prior to amalgamation.

As was mentioned above, tobacco was seen to be more mature and could actually be used as a tool to help shape the organizational development, and it serves as a model to this day for chronic disease prevention. The recent addition of a TCAN function to the PHA is expected to generate a greater capacity for outreach, engagement, and partnership with other members of the SFO strategy, community members, and other PHAs and TCANS. The PHA has been a long standing leader in Canada and is active in the Canadian Urban Public Health Network.

The PHA had staff seconded to the Ministry of Health Promotion (MHP) during the developmental phase of the Smoke-Free Ontario strategy, and this was apparently beneficial to both parties. The MHP benefited from professional staff with local knowledge and province-wide contacts and the PHA staff benefited through the returning staff's insights and enhanced professional skills, particularly with respect to policy analysis, systems thinking, strategy, and political aspects of tobacco control. The PHA has open lines of communication now with several key staff in MHP and is working to assist the province with its role to promote culturally appropriate tobacco control program materials.

Momentum for tobacco control policy development is seen to have shifted to the provincial level from the local level. Now major issues have to do with the interpretation and impact of MHP directives pertaining to the enforcement of the SFOA and regulation. While there are some concerns about sustainability (e.g. is the 100% funding going to continue? It was not sustained for the innovative grants), this is not a large concern for this PHA. With new funding in place, some of which has displaced the municipal funding, and a renewed policy commitment to tobacco control provincially including legislative and regulatory reform and substantial financial investments, there is a sense that the program will be sustained. Nevertheless, there is hope that the program will not be needed in future years due to elimination of the problem, but is this not seen in the short term. Some community members expect future developments in tobacco control (e.g. restaurateurs expecting municipal bylaws to ban smoking on patios).

4. Potentially competing public health issues

The PHA is engaged in the full range of public health matters. As a result many public health issues could and likely do compete with tobacco control regularly during operational planning and resource allocation meetings include but are not limited to those mentioned in passing during the interviews – chronic disease prevention, child health, nutrition, climate change, healthy environments, reducing health disparities, food safety, infectious disease control, and many, many others. It should be noted however that these potentially competing issues also present opportunities to potentially reach individuals and groups who use tobacco industry products more frequently and may therefore assist with more appropriate targeting of tobacco control efforts.

5. Structure

Organizational level planning structures are in place within the PHA through a special section that is responsible for coordinating policy and planning. This is conducted as an organizational-wide activity engaging the tobacco control, chronic disease, and healthy environment directors, managers, and staffs. This includes strategic, long-term directional planning as well as annual operational work planning. A group was, at the time of interviews, being convened to plan for integrated chronic disease prevention and a separate but related group is being convened to rethink the direction and logic of all existing and potentially new tobacco control efforts of the PHA.

The medical officer of health, directors, and managers all share an interest, need, and commitment to see coherence within programs (e.g. tobacco control) and across programs (e.g. integrated chronic disease prevention).

The PHA has a well established health information and analysis section which conducts epidemiological surveillance of major trends and variations in population risk and disease. Evaluation services and consulting support is provided by a small staff (3-4) centrally. Library services are also available. All of this contributes to a culture in which organizational level learning and planning are valued and supported.

B. Organizational environment

1. Critical relationships

The MHP and the Ontario Government are seen to have implemented far reaching and momentous change through the creation of a SFO movement, investments, and the SFOA and regulations. This is in addition to the already expected tobacco control effort prescribed under the HPPA's mandatory program for chronic disease prevention. These provide 100% and 75% funding respectively, providing considerable leverage for local workers to carry out and implement tobacco control efforts.

While there has clearly been leadership from the Province, there is a sense that there could be more interaction with the field. The PHA senior staff acknowledges that they have much to gain and much to share from facilitated exchange across local PHUs and PHAs. There is a need also for a greater sense of connectivity with the provincial partners, and the insights and experience of the field could really well inform government policy making. Having had key staff spend staff at the Ministry makes this all the more obvious.

There are issues about the potential inconsistency in the application of the SFOA due to poor or ambiguous communication from the MHP, requiring sorting out with colleagues in other PHAs in order to ensure consistent application of the SFOA and regulation. The PHA looks to the province for data collection and reporting systems that are functional and timely, and there is a reliance on the educational resource materials produced by the MHP for field application. The MHP could benefit more in the multicultural/multilingual development of educational resource materials if it chooses to take advantage of the partnership opportunity with this PHA.

There are good working relationships between the TCAN coordinator and the MHP communications staff and good working relationships are starting to develop through the Community Action Working Group (CAWG) subcommittee on communication. There is a view that the CAWG received a great deal of information from the field, although it is not clear how it is processed by the MHP and little feedback is offered to the field. There is a sense that the CAWG has become essentially an issues management forum for the MHP. Some in the field see the subcommittee on enforcement and the CAWG as a means to keep pressure on the MHP to follow-through and deliver on commitments.

TCANs are seen as a great opportunity for partnerships and sharing, and the full benefit of horizontal sharing of information across TCANs has not been fully realized. This particular PHA is in the midst of role clarification vis-à-vis the TCAN coordinator and other managers in the PHA's tobacco control strategy. It is anticipated that communication within the TCAN, among TCANs, and among SFO partners, including the ministry could and should be improved. TCANs are also a good forum to engage voluntary sector health agencies and the federal government on joint projects and to foster constructive working relationships.

2. Financial transfers

As noted already, the most obvious financial transfers are those from MHP and MOHLTC for SFO strategy and mandatory public health programs funded at 100% and 75% respectively. In addition to this, Health Canada has periodically funded initiatives in this PHU and these transfers date back to the early 1980s (Health Promotion Grants and Contributions Program) and mid-1990s (Tobacco Demand Reduction Strategy).

3. Geography

As mentioned above, forced amalgamation of six PHUs and PHAs in the late 1990s led to the creation of a large PHA in a relatively large PHU. There is reported to be more than 1 million people resident within less than 650 square kilometers. There was a region-wide government structure, with more than 75,000 workplaces. The PHU is seen to be a bit of an outlier, being 3-4 times the size of the next largest PHU and this makes its challenge of service unique.

4. Partners and coalitions

As discussed already, the PHA has many partners in tobacco control. It organizes the TCAN, was a teaching health unit, works closely with OPHA, has a long standing relationship with Health Canada's regional staff, supports disease specific coalitions (e.g. cancer, heart health, council for tobacco free local areas and Ontario), its staff have faculty appointments at multiple universities and community colleges, staff attend universities and colleges for continuing education, and the PHA has long engaged voluntary sector partners.

5. Politics

When it comes to local public health policy development, in this PHA its well acknowledged that there is sometimes "tremendous political pressure and lobbying to do things that weren't good for public health" and that the political environment is an obvious and key contributor to public policy. It was suggested that, at least at present, there was generally a favorable political climate for public health work and that this impacts policy (including healthy public policy) and budgetary decisions.

The recent changes in the electoral cycle permit a longer period of time to establish working relationships and knowledge exchange and development among policy-makers. More seasoned politicians work with the PHA on issues and policy change. Coalitions (e.g. cancer) are less frantic as they realize that there is time to promote aware of issues and a window of time to move multiple issues along.

The medical officer of health noted the need for her/him to be involved where there is controversy or decisions that have important resource allocation aspects. For example, current community "right to know" legislation proposals are generating considerable public attention and it is in the public's interest to know what is going on at city hall. The medical officer's advice is public, unlike provincial and federal policy advisors' advice on policy matters at these other levels.

The city has also seen the value of the political dynamic and the board of health has been used as a bit of a "soap box". The board itself doesn't seem to shy away from controversy and it creates opportunities for public education and community exposure to issues through hearings/meetings on public health issues that affect the community.

In terms of local-provincial relations, there is a strong recognition within the PHA that other levels of government must take responsibility for social policy and healthy public policy, and that the more senior levels of government can be powerful shapers of local policy environments that may (or may not) be conducive to health. There remains concern that the formal structures created to facilitate input to the government policy process (e.g. CAWG and the Minister's advisory committee) provide advice but there is very little interaction with the field after advice is given.

Locally, particularly within the PHA, but also with outside partners, there is a strong and growing sense of collegiality. There is also an optimism that the political/policy landscape has changed as a result of the SFOA and SFO strategy. While not perfect, there is a sense of optimism that tobacco control's progress will continue and not back slide.

C. Information and Evidence

1. Empirical evidence

The PHA relies on a variety of sources of empirical evidence to inform its decision-making – evaluation, externalizations/stories, health assessments, scientific literature, and surveillance and monitoring. It also relies on several other sources of information which are discussed briefly in the following section.

As previously mentioned, there is a small staff of evaluators (three or four) to provide evaluation support for priority projects – more internal capacity than most PHAs. However, as evaluation is very resource intensive, very few of the PHA programs can be evaluated annually.

Action research and reflection on practice is apparently valued by directors and managers. More non-traditional (interpreted as qualitative and multimethod) evaluation and action learning approaches are needed. The cycle of "assessment to evaluation" is seen to be integrally linked in tobacco control practice and so action research should be seen as a natural part of practice. There is a sense that as the TCAN plan is developed, there will be a built-in peer accounting for progress made.

Incorporated into the strategic plan, the PHA will try to base decisions, as much as possible, on science, the understanding of the relationships between interventions and outcomes, and the kinds of interventions are most likely to prove effective to protect and promote health.

During interviews, stories about how protection, cessation, and prevention staff can work together were told (e.g. coordinated educational effort with Canadian Cancer Society staff, tobacco enforcement personnel, and others in a workplace).

Health indicators, linked logically to programs and services, are monitored. A special health status report with key indicators for tobacco control has been produced. The PHA relies on multiple different sources of information about the health of the community – risk exposure, health status, etc. aggregated at different levels of analysis and prepares health status reports for the board of health and/or council.

Scientific literature is frequently consulted by professionals working in tobacco control and chronic disease prevention to understand not only what might be effective but also the mechanisms of intervention

operation, so that information from different bodies of literature, identifying the same approaches and interventions might be applied in multiple settings or with multiple population groups. Audience-based reviews have been particularly useful (e.g. for interventions directed toward children and youth populations). It was suggested that in tobacco control, the literature is a very important kind of evidence, often overriding others in importance when coming to decision-making.

There is also an apparent high and growing demand for literature pertaining to new and emerging issues, such as drifting smoking in multi-unit residential dwellings.

There was also a suggestion that scientific literature is most critical in preparation for a policy discussion and less so afterwards. However, at the later stages it still retains educational value to assist with implementation and maintenance of policies (e.g. smoke-free legislation) including justification for the policy decisions that have been taken. This information is shared with enforcement and program staff on a regular basis.

Last but not least, surveillance information is seen as important. The data from the Rapid Risk Factor Surveillance Survey, for example, comes to bear on tobacco control decisions. There has been discussion about the need to pick one or two key indicators and really pay attention to those and determine if the trend lines are going in the same direction as plans suggest they should be.

2. Technical assistance and training

Technical assistance and training also takes many forms. Best practices, guidelines, and systematic reviews are seen as important. There have been learnings about intervention effectiveness over a 30-40 year period in tobacco control and so the PHA makes itself aware of these sources and tries to use the most promising of practices based on the literature. Health promotion consultants within the PHA act as consultants/content experts to assist to the rest of the department.

There is recognition that scientific information is important but not sufficient. It is important to contextualize and use scientific information along with what is known about population and service settings.

In the enforcement area, there is and must be heavy reliance on advice and direction from the province. There are certain aspects of enforcement that are prescribed by the court system. Some PHUs don't follow MHP directives (e.g. warning letters) and this is a bone of contention among PHUs and MHP.

Protocols and instructions can come from the province, in some areas, but in most, they are developed locally with input from field staff and others. As noted above, there has been substantial provincial leadership in tobacco control, but insufficient interaction and horizontal transfer of lessons learned in implementing tobacco control in Ontario.

Training is also available from various sources, including other municipal government departments (i.e. corporate training opportunities), professional practice networks within the PHA, in-house training and mentoring (e.g. leadership development), TCAN training programs, and those developed by provincial resource centres for health promotion in general (e.g. health communications) or tobacco control in particular (e.g. Program Training and Consultation Centre, Training Enhancement in Applied Cessation Counseling and Health [TEACH] sponsored trainings).

Training and technical assistance is seen by senior management to be essential to meet the sixth strategic direction for the PHA, i.e. to be a workplace of choice among public health professionals. The PHA is seen to place value on human resource development. For this reason, the PHA supports practice-based leaders' networks, have a chief nursing officer, and have an inter-professional practice leaders' network that is chaired by the medical officer of health.

3. Networks

In addition to the creation of formal professional practice (nursing, environmental health) and inter-professional networks, communities of practice and networks involving staff also exist external to the PHA – although it is more likely that directors, managers and senior consultants than front line staff find themselves regularly engaged in them. A community of practice (as defined by Wenger and others (E. Wenger et al., 2002) is not a very commonly practiced concept at all.

The PHA actually has a position for a manager of professional practice committees. This person was formally with the teaching health unit and provides leadership on health workforce development – and was an award winner in the Canadian Health Services Research Foundation's, Executive Training for Research Application (EXTRA), competition.

As mentioned above, the PHA's medical officer participates in the Urban Public Health Network which has about 18 urban areas engaged, representing more than half of the population of the country. TCANs also serve as an inter-PHU community of practice, although those interested to engage with peer professional need to go to other TCANs to do so. Nevertheless the PHAs TCAN is designed to foster collaboration between organizations on prevention, protection and cessation projects.

Reflective practice is also important to the PHA. As one interview noted, "you learn a tremendous amount from your mistakes" although it was also noted that outcome changes in terms of population shifts in risk factor prevalence may take a long time to observe (smoking seen as a slow motion intervention). While managers spend a lot of time with staff, reflective practice has not been prevalent enough for some senior managers and it is expected that this will develop in the future. Staff are often together at least monthly (e.g. tobacco enforcement officers), and this provides an opportunity for professionally based learning and reflection and lessons can also be shared via documents and minutes of meetings for those who must miss meetings.

4. Background

Additional background information is considered by PHA senior managers in making decisions. This includes imperatives and obligations determined by mandatory programs and services under the HPPA (75% funded by MHP and MOHLTC), grants and contracts from SFO or Health Canada (100% funded), and expectations of the community and board of health. In addition, random audits are used in some areas (e.g. public health inspection re: reporting/form completeness and compliance with protocols) and serves as a quality control measure to ensure that procedures are followed. In addition, the PHA is aware that it will undergo audits if concerns are expressed by municipal politicians about public health practices (e.g. inspection of restaurants for "dirty dining"). The PHAs also undergoes voluntary accreditation on a regular basis, and it applies of the Ontario Council on Community Accreditation quality framework for public health.

D. Interpretation and Contextualizing

1. Adapting and contextualizing

Within the PHA it is recognized that good information and evidence is key to sound decision-making. It is necessary but not sufficient. The PHA itself, or at least the directors, manager and staff within it, must take the information and interpret it light of the action context in which they wish to apply it. They must take it in, process it, and use it.

A wide variety of factors affect how the information will be used. Among them are the following: accountability structure (where the resources are located, who's responsibility and decisions are to be made about allocation of resources); complexity in terms of the number of players that need to be engaged (e.g. in partnerships); inertia (a lot of players have a lot of weight that is difficult to motivate to move/change); current understandings and paradigms of action, mechanisms, interventions etc.; champions for new initiatives and old ones; staff skill sets; setting and target population characteristics (e.g. youth, gay/lesbian,

cultural populations); past experience with similar initiatives; fit with the organizational vision, mission, and strategic directions – as well as fit in the context of the chronic disease prevention and tobacco control strategies for the PHA

2. Social construction of knowledge

As might be expected in a relatively newly reconstituted and reorganized PHA, considerable effort must be spent "trying to make sense" of the world in terms of a new organization. Initially, the PHA took the form of a regionalized and fully matrixed organization with a single PHA-wide lead manager in one region being assigned primary accountability for tobacco control PHA-wide, and with diffused implementation responsibility resting with this same regional manager and three other regional managers. As mentioned above, following initial amalgamation, there were initially 42 points of accountability within the organization – one might say extremely diffused accountability. Clearly, the senior management needed to and then realized that they wanted to come together to make sense, build agreement, marshal resources, monitor progress in implementation, problem solve, share lessons, and develop shared meanings for terms and develop a common language and so on.

As the shared view realized that there were gains to be made in public health with a coherent and well integrated PHA-wide approach, and the fact that tobacco control science and practice was seen to be generally more mature than many other areas of public health practice, it was agreed that tobacco control should be developed as a priority within the new PHA.

The current director with lead responsibility for tobacco control has long been a champion of integrated chronic disease prevention and clearly has seen tobacco control to be a priority within this. The same can most certainly be said about the apparent lead manager for comprehensive tobacco control who, with full support of the director, has championed tobacco control as a priority within the PHA and the province. The environmental health director and manager responsible for leadership on the bylaw development and implementation, *Tobacco Control Act* (TCA) enforcement, and subsequently SFOA implementation in the PHA are well recognized as leaders among public health professionals in Ontario for their innovative and effective work in tobacco control.

As noted in the interviews, the tobacco control leadership within the PHA relies and bases much of its strategy on scientific literature. However, they reportedly "kind of incubate" their own work with the PHU's unique populations and contexts. They develop plans and realize the need to be flexible with communication and implementation. Sometimes, there is a view, that the "Achilles heel" of their strategy is that they "set plans but may not be really good at sticking to them", but this is in large part due to the need for interpretation and rethinking, tailoring, and adapting interventions based on local knowledge. There is also as sense that the PHA could do more to systematically bring lessons back from the frontline and factor this knowledge and experience into future plans. For this to happen, the non-traditional form of evidence will need to become more valued. And, there is some indication that this is in fact happening. Recent planning to address equity issues involved bringing frontline staff into PHA senior management meetings for frank dialogue about problems and what may and may not work within the PHU.

The PHA recognizes that it, together with other PHAs and tobacco control partners across the province, are generating a great deal of experience about tobacco control in real world situations. There is a real interest and willingness to share "tremendous learnings in the field" and jointly develop and synthesis tobacco control knowledge with others. This values the "deep roots" that the PHA has in the community. However, there is a need for the MHP and its staff and structures to facilitate this social process.

PHA staff seconded to the province benefited both the MHP and the PHA and this is one mechanism that may be well used to facilitate cross fertilization of ideas and knowledge in the future. Within the PHA workforce itself, there are staffs of different ages, backgrounds, and orientations. New graduates have inquisitive minds and there are interesting relationships that develop among staff of different ages, somewhat akin to intergenerational learning. People learn from each other. It is also acknowledged that frontline staff are generally younger and don't bring the "old PHA" way of doing things to their new roles. The infusion of new staff with new ideas and fresh perspectives, guided by centrally developed programs is

seen to be a positive social development with fresh learnings and new knowledge and practice emerging within a new organizational culture.

The complexity of tobacco control (i.e. imbedded within chronic disease prevention, within a hierarchical structure, with decentralized and line responsibilities for implementation, yet engaging with horizontal professional and inter-professional networks) provides both challenges and some barriers for social learning. The structures now being created for management across the department are seen as a mechanism to facilitate learning. It will provide a forum for leadership and social learning, provide a mechanism to profile success and to gain social/organizational recognition of innovations, encourage uptake and diffusion of things that are seen to work, and permit the emergence of an increasingly effective and coherent PHA-wide strategy.

This tobacco control strategy redevelopment is, as mentioned previously, nested within a chronic disease prevention strategy, and occurring within an organization that is consciously trying to transform its own culture of leadership and professionalism into a "culture of possibility". While previous challenges (i.e. SARS) were seen to "shake everything to its core", now the PHA is coming together and emerging with a more unified and widely held vision which embraces evidence-informed practice, shaped by community needs, and the professional judgment of its directors, management and staff. In meetings, staff regularly challenge each other to "suspend their pride, their fiercely held beliefs, the shoulds and musts" in ones' life work and "make themselves available to hear and learn from each other".

In the social synthesis of understanding and decision-making, the PHA medical officer, director, and managers all acknowledge that politics and pragmatics must factor into knowledge about what to do and what will work in local circumstances. Having a sense of what is politically possible is critical to interpreting evidence and design strategies that will be acceptable and therefore implementable in the context.

The PHA values community involvement and participation in policy debates and forums. It therefore consults and interacts with key community representatives as policy is developed. However, senior management of the PHA also recognizes that it has a unique role to play in board of health and council decision-making. It is expected to and does advance policies which are based on its judgment about how public health concerns can be best addressed in a manner that is informed substantially by current public health science and understanding.

The individuals interviewed are clearly recognized as leaders in tobacco control in Ontario. Their positive reputations and identities as respected public health leaders comes to a large extent from them their own personal histories and roles in tobacco control and other public health matters (e.g. chronic disease prevention, "dirty dining" response). Personal credibility and effectiveness of their past interventions is based substantially on the fact that they developed well reasoned and socially defensible strategies to address public health concerns, sometimes under the spot light of media and political scrutiny.

As noted above, the PHA is very much concerned about the cultural sensitivity and competence of its staff and programs. There is widespread recognition that this involves more than "language" and has to do with cultural beliefs and values. Therefore, PHA managers have adopted an open posture in order to understand community views and develop interventions that are sensitive to these views, yet at the same time effectively address public health problems (e.g. need for SFOA to be complied with, encouragement of cessation etc.).

Interaction with the MHP is very much a social process. CAWG and task group meetings, as discussed above, are opportunities for the tobacco control field to affect MHP senior management knowledge and positions. These structures, as well as interaction with colleagues in neighboring TCANs, provide an opportunity for social exchange and the development of a shared understanding and hopefully common or consistent approaches to implementation, particularly in the area of SFOA enforcement.

Cellular telephones and other wireless devices make in now easier for professionals in the field to interact with their managers. It is anticipated that future developments in wireless technology may put more

information directly into the palms of field staff. This will affect their knowledge about recent developments, how similar cases were handled, PHA policy and procedures, and permit instantaneous and clear direction from managers to the field in situations requiring rapid communication.

3. Theories of action

As discussed previously, the PHA has previously conducted strategic planning to align goals, objectives and interventions in the major areas of tobacco control – i.e. prevention, cessation, and protection. Furthermore, the current planning exercise is redeveloping a logic model and indicators that would be measured over time. Essentially, there is and will be an organizationally developed view, informed by science and other evidence, about how tobacco control interventions will achieve prevention, protection, and cessation goals and objectives and a process put in place to track progress in these areas.

Various models of organization are also be considered for the overall strategy, and at the time of interviews a decision had not be taken about the preferred organizational model for planning, implementation, and accountability. However, there was an emerging preference for a central secretariat, with coordinated monitoring, and collective accountability through a single director to the medical officer.

As noted above, tobacco control has been seen as a model for other planning – specifically for integrated, comprehensive multiple risk factor reduction for chronic disease prevention. The EXTRA fellowship model is also seen to be developing an interesting model for coordinated leadership development, which may be more generally applied throughout the PHA.

At more micro levels of analysis, i.e. for specific intervention, there are several theories of action that are considered. Examples, mentioned in interviews, related to resilience, decision-making and risk taking, social determinants of health (e.g. homeless, drug users needing different approaches), cultural and normative change, healthy public policy, etc.

4. Wisdom

While not mentioned repeatedly in the interviews, there is a sense that there is experience and wisdom amongst the providers who work in the organization. There is a clear interest in bringing frontline knowledge about what staff and managers find effective into the decision process. This is seen to be a great resource, which while used and reflected in practice, could be more systematically incorporated. "With 1500 that are in the community everyday delivering services to real people and they have an awful lot of experience and evidence of community need, of community attitude, of what works, of what doesn't work as a public health intervention … don't have a very systematic way of capturing that influence."

5. Working knowledge and knowledge conversion

Senior management in the PHA recognizes that there are differences between small and large PHUs and PHAs. Furthermore, there is a very wide range of issues that must be addressed by staff of local boards of health, and while they vary from PHU to PHU, many of the same issues will arise. Given the range of issues, senior managers/directors and the medical officer will need to pick and choose which issues will garner their own personal attention. These tend to be those for which there is personal accountability. Controversy and importance are other factors which determine the degree of attention and focus on an issue. In public health, the medical officer of health is both the chief medical/professional authority and the chief executive officer. This limits the time that can be devoted to each.

In a large PHA, there is a "luxury" of being able to designate content responsibility to various directors/managers/staff – as there are enough human resources that the PHA can afford to differentiate and specialize in certain policy and program areas. The medical officer and other senior management therefore rely on the expertise of their staffs – particularly when they themselves have chosen not to delve into the evidence.

Senior managers have experience in working in smaller organizations and they find that in the larger PHAs there is less need to delve into the scientific evidence, as there can be a certain reliance on staff professional expertise and expect that reporting professionals are up-to-date on the latest findings. There is therefore an opportunity to be concerned also with other forms of evidence – e.g. from the management literature and be concerned about organizational development and organizational change.

There are other skills however that senior manager must have. They need to review their staffs' work critically and ask penetrating questions to determine the extent of knowledge and critical thinking that their staff are factoring into their analyses and advice. Furthermore, particularly when it comes to board of health reports, there is a need to review staff work with a view to concerns that are likely to arise in board meetings. This is of course a very social process, anticipating how ultimate decision-makers minds will work and brokering access to critical information that will be required. In addition, there is a role of senior management to ensure that scientific evidence coming forward for decisions is appropriately framed and presented in a coherent way in light of the current context and decision-making environment.

D. Decision-Making, Practice Integration, and Experience

Within a large hierarchy with delegated responsibilities and accountabilities, there are of course many decisions that are made that are strategic, management oriented, and/or operational in nature. As discussed above, there are annual and seasonal (e.g. quarterly) budgeting and operational planning cycles. The PHA, as an amalgamated PHA, has spent time and effort to develop a strategic plan for the whole organization.

At the time of interviews, it was also engaged in planning processes for chronic disease prevention, and for comprehensive tobacco control, that are expected to lead to coherent strategies and implementation plans. In tobacco control in particular, there will be a project management plan that articulates roles with respect to intervention approaches to be taken (i.e. programs and services, policy, media), settings to be engaged for development and implementation of interventions (e.g. school, workplace, health care, shelter, neighborhood, family/home), and priority populations to be reached (e.g. general population and/or cultural community, age groups, smokers/non-smokers etc.). At the same time, there is consideration given to what to do with so-called cutting edge issues (e.g. drifting smoke in multiunit dwellings, smoking on patios etc.), concern for equity and access of services to the community, as well as how the various interventions might be coherently coordinated amongst themselves in a manner that make sense for delivery (e.g. one visit to a workplace with information about SFOA, cessation, general information and how concerned workers might be involved with family-based prevention, rather than multiple separate and potentially redundant visits).

E. Time

Of course time is an ever present aspect of all life and public health work is no different. However, various aspects may be differentiated. For example, tempo pertains to the pace of activity. When implementing new legislation, there is an imperative to be ready for the effective date. Annual events have their own temporal imperatives and urgencies, but are more easily planned when integrated with operational routines. There are decisions and action plans that require decisions in practice situations (i.e. on the spot); others that occur over longer time frames (e.g. national non-smoking week, campaigns for cessation, or day to day), and over a course of years. As mentioned above, this PHA has a long history of leadership and action in tobacco control and its own local history. There is a tendency to talk of this history by referring to various eras (e.g. early bylaws particularly pre-amalgamation, post TCA including bylaw developments in old PHUs during the years intervening between TCA and amalgamation [such as 1997 bylaw in one PHU], post amalgamation activities, and post SFOA and strategy).

2. Tobacco Control Action System in a Mixed Urban/Rural Context

This public health agency (PHA) has been a leader among PHA with respect to community engagement and the implementation of a bylaw that created 100% smoke-free public places. Staff in this PHA has demonstrated exemplary leadership in many aspects of health promotion and disease prevention and are well recognized for work in dealing with equity and access and social determinants of health-related matters. The PHA is responsible for a regional public health unit (PHU) which, according to Statistics Canada, contains less than half a million people and increased in population size since 2001 at a rate greater than the provincial average. More than 85 percent of the population lives in a city or town. The land area of the PHA is more than 1000 square kilometers. The population density of the public health unit is less than 500 people per square kilometer.

The prevalence of smoking in a vehicle when a child is present and current smoking prevalence (age 12 + years) is lower than the provincial average. The rate of decline in smoking from 2000/01 to 2005 was more than seven per cent, greater than the provincial average reduction.

A. Organizational aspects

1. Capacities and competencies

There are about 10.2 full time equivalents (FTE) staff funded under the Smoke-Free Ontario (SFO) strategy and approximately 18 FTE positions have been funded under the mandatory chronic disease prevention program cost shared with the Province of Ontario pursuant to the *Health Protection and Promotion Act* (HPPA). There were three, but are now two, tobacco bylaw enforcement officers.

In this PHA, the medical officer of health has played a major strategic leadership role in establishing the organization as a leader among PHAs in Ontario in tobacco control. He/she has also played an active role in maneuvering issues through the political approvals process and facilitating partnerships with outside organizations. While he/she concedes that a good part of the community organization and policy work for the regional bylaw was completed by his/her predecessor and senior management staff in the PHA, particularly in the environmental health director, the medical officer is a steadfast advocate for strong controls on smoking and has established the organization as a leader by virtue of a role it plays as a key partner in a key resource centre in the resource system, i.e. which was enhanced to support the implementation of the Smoke-Free Ontario (SFO) strategy. At this point, having established a track record in local bylaw leadership and the establishment of a unit that consolidates tobacco control for the PHA under the direction of a single manager who has substantial support from other line managers, the medical officer is less involved in operational aspects. He/she still serves as a strategic director and member of the strategic directions committee of a key provincial resource centre and is supportive of his/her manager and staff who are more actively engaged in the day-to-day operations of the PHA and provincial resource centre.

The tobacco control manager manages the staff of the resource centre (which is not the focus of this study) and oversees parts of the cost shared programming in tobacco control, although admittedly this latter aspect is still to be fully coordinated by this office. Enforcement of the bylaw and *Smoke-Free Ontario Act* (SFOA) has been transferred over to a "licensing and regulatory services" department of the regional government, which previously had been administered within the public health inspection and environmental health area of the regional health department. Public health inspection staff still plays a role in some areas (e.g. long-term care facility compliance with the SFOA). The medical officer credits the staff of this unit and environmental health for being very knowledgeable about tobacco control matters.

Within the PHA, a decision has been made that each program within the PHA will be supported by a health planner, essentially a transformed health promotion planning role, which assists with all aspects of public health program planning, implementation, and evaluation. A public health planner played a key role when assigned to work with a local coalition to coordinate efforts on the regional smoking control bylaw and this is discussed below. The health planner position is now part of the tobacco control program unit under the manager's direction and support.

At this point, now almost seven years since the implementation of the 100% smoke-free indoor provisions came into effect and many responsibilities have been transferred to the licensing and regulatory services department, the role of the manager of environmental health service has been transformed into a consultative role with respect to tobacco control – i.e. consulting to the tobacco control manager. The manager of tobacco control now assumes responsibility for the administration of contracts for inspection and compliance related activities and is responsible for reports back to the Ministry of Health Promotion (MHP).

The PHA is a unionized organization. Union contracts leads to hiring practices that general bring in staff at lower salary rungs and with less experience. As a result, young staff is mobile and there is a fair degree of staff turnover, yet management believes that they have been very fortunate to attract and hire high quality staff. In addition, there are regular resignations, maternity leaves, and other absences that require attention on the human resources front. Staff turnover requires constant vigilance on the part of senior management – continual recruitments and training and retraining of professional staff.

Staff turnover was also seen to be a problem following the major gains in tobacco control as in the local bylaw development. When senior people leave, they take with them their corporate memory, skills, and relationships they developed over years. Clearly, this department sees staff as its most critical resource.

The department also is credited for finding opportunities for staff mobility within the department. One health planner explained that he/she had been with the PHA for about 11 years and had four different jobs. This was interpreted as good for both the department and the individual, being able to contribute to public health progress at the same time being able to grow professionally in new and evolving roles.

Senior managers and directors clearly had great respect for those who had come before them, one senior leader now deceased and another who is apparently happily retired and still in touch with his colleagues periodically. The now retired director of environmental services who hired the manager of environmental health who was initial (but no longer) responsible for bylaw enforcement was very highly regarded (Noted above, enforcement activities are currently implemented through a licensing and regulatory services department of regional government). He/she was seen as a role model of calm under pressure – a consummate public health professional who knew the science and was consistent and continually committed to the elimination of second hand smoke as public health problem. He/she was accessible to politicians, the community, and his/her staff and colleagues – and no matter how heated the discussions, he/she was calm and collected and therefore very capable to lead the process of bylaw reform.

The human resources and labor relations aspects of the PHA were seen to be of paramount importance. This led to as sense of staff security and management was continually cognizant of the importance of respecting the labor agreements.

As the PHA was committed to immigrant health issues and had a long standing working relationship with a community agency that had been working in immigrant settlement for some time, it was able to initially support their involvement in cessation services for immigrants (although the MHP terminated funding prematurely). Some short term honoraria were appropriately funded through partnership agreements with outside organizations (e.g. immigrant professionals' roles in a short term project related to smoking cessation funded under the innovation grants).

It is noted that the PHA has substantial human resources at it disposal, some internal and some external to the department. These include epidemiologists, evaluators, researchers, legal services, bylaw enforcement services, and communication support services to mention a few. A central department which was created with the support of all divisions is responsible for assessing health determinants, planning, policy development, mandatory program compliance tracking, and evaluation. It is also a major proponent of evidence-based practice, logic model development, information systems, and cross regional government planning. They also support the building of trans-disciplinary health planning skills development. By all accounts, there is also a well developed and functioning central library service operated within the PHA, as well as intra/internet access to key informational/library resources.

There is a nursing practice group within the PHA. Corporately, within the region, there is substantial support for management and leadership development, including an emphasis on succession planning.

In spite of the professional staff capacity, there is some concern about the overall capacity of the PHA to adequately engage the community of close to half a million people, with diverse communities and geographic distances between them. The use of health planners however recognizes that the PHA must work with partners in order to have adequate reach, and community involvement is seen as key strategy, perhaps one that needs to be further developed again in the tobacco control area after a hiatus following passage of the smoke-free bylaw.

Cultural sensitivity (e.g. gay/lesbian, new immigrants, people with disabilities, blind/low vision etc.) and a focus on equity and access has been a capacity building priority for the PHA over the last 5 years. There is a sense that this is now well imbedded into the culture of the organization and has been in fact institutionalized.

Of course, tobacco control programming through youth action alliances, enforcement, high school grants, lifestyle resources for cessation etc. all represent areas of PHA capacity.

The PHA has established strong working relationships with the community, another key aspect of capacity. Relationships exist with regional politicians, municipal governments, universities and specific experts within them, other government departments, the YM/YWCA, hospitals, voluntary health agencies (e.g. Canadian Cancer Society, Lung Association, Heart and Stroke Foundation of Ontario), integrated chronic disease prevention coalitions, provincial advocates (e.g. Michael Perley and the Ontario Campaign for Action on Tobacco), key resource people (e.g. Josie d'Avernas), the regional Tobacco Control Area Network (TCAN), as well as community citizens and activists. Before the interagency council became inactive, there was also a strong working relationship with it.

In addition, the PHA has been engaged department-wide in pandemic and other public health emergency planning, including a review of all pertinent organizational procedures.

2. Organizational culture

The PHA senior management is consistent on their views about what is important to the organization. Clearly, the management values continuing education and professional development (including training for skills enhancement, encouraging staff to attend conferences and training sessions, as well as holding internal seminars). There is also a strong culture of evidence-based practice, including basing policy and program developments on assessments of determinants of health, epidemiology, logic models, and data-based approaches.

There is also high value placed on access and equity concerns, consistent with a health determinants orientation. A population health orientation that embraces diversity and services to high need and special population groups is reflected in the vision and action of the organization. This has been institutionalized in the core values and day-to-day activities of the professionals working in the PHA.

As mentioned above, high value is also place on human resources and labor relations.

Accountability for investments and actions is also highly valued and this is reflected in regular reporting systems for mandatory programs and information systems and participation in benchmarking initiatives. Community engagement, including partnerships, is seen as a valued and necessary aspect of public health practice in this PHA. The organization also aspires to be a centre of excellence, perhaps a future teaching health unit, and to advanced state of the art interventions and systems developments. The medical officer and his/her staff have a vision and yet realize that sometimes it takes considerable time and patience for initiatives to unfold (e.g. 10 years of community and council related activity related to the 100% smoke-free bylaw).

Other values mentioned include research ethics, taking a planned approach to public health, evaluative research using multi-methods, leadership and succession planning, reflecting the values of the wider community, decisiveness, and preparedness (e.g. for emergencies).

There is tolerance of error provided that there is learning from mistakes and serious errors are not repeated. Individuals who point out "red flag" situations are actually acknowledged and encouraged to do so again in the future, as anticipation of problems and early interventions before situations develop into larger problems is seen to be a good thing. There is perhaps less tolerance for management errors that affect labor relations, as labor and the union agreements are sacrosanct.

The PHA and its board of health (i.e. regional council) have a high tolerance for discord. During the implementation of the smoking control bylaw, there were some factions of the community (businesses) that were very upset and initially there was substantial defiance. However, the PHA was steadfast in its resolve to address the issue and politicians were very supportive, demonstrating their commitment and integrity when it came to public health.

Community organizations worked very closely with the PHA, and were clear about roles and responsibilities – permitting the PHA staff to assume its authoritative role and the community coalition engaged in lobbying and broader public education efforts. It is interesting to note that the PHA actually provided staff resources to chair the coalition as it was seen to be critical to the success of the bylaw development process.

3. Organizational changes and developments

In the last half dozen (or seven) years, the department's staff complement has probably doubled. During this period, the PHA decided that it required greater planning, information, and communication infrastructure. All divisions supported the development of a centrally located structure to address health determinants, planning and evaluation. Access and equity concerns were central to this development and it took five to seven years for these changes to actually be institutionalized.

While tobacco control efforts were previously coordinated through a healthy lifestyle resource group, with the expansion of activities during the SFO strategy and SFOA implementation, the need and opportunity to hire a manager specifically for tobacco control and create a small staff became apparent. Moreover, in the last several months, given this PHA's stellar example with 100% smoke-free legislation, resources were made available to permit the PHA to become a major partner in a key provincial resource centre of the SFO strategy.

The manager, when hired, became the first manager of this new unit and responsibilities were transferred from the healthy environments area. As a result, the environmental health service is now largely in a consulting role vis-à-vis the management of the PHA's overall tobacco control effort. Tobacco enforcement officers (two) are also involved on a very limited basis in inspections related to tobacco control (e.g. compliance with long-term care facility regulations under the SFOA), although issues rarely arise.

The tobacco unit and manager are physically located in a PHA office that is in a city other than the main office of the PHA. While the health planner assigned to tobacco control was once part of the central planning resource service, the position has now been established as one of the core positions within the tobacco unit.

In the past, there have been working relationships between the tobacco control program and integrated cardiovascular disease and cancer prevention initiatives, although they have always been separate. For example, the heart health initiative contributed to public education efforts in support of the smoke-free bylaw campaign. There have been some developments related to workplace health promotion where collaboration has developed and a workplace health promotion initiative is underway as a pilot project. Furthermore, there is department-wide interest in the youth action alliance model. As the tobacco unit's

model is more expensive and has hired a manager to oversee it, there is the potential that this may be expanded to other issues in the future (e.g. prevention of the onset of obesity among children and youth).

4. Potentially competing public health issues

A very wide range of potentially competing issues was raised during the interviews. Some of these are related to tobacco control and developments in these areas may actually lead to enhancements and integration of tobacco control efforts. Examples include: food safety, lifestyle, communicable disease control, substance abuse, lead in drinking water, immunization, pandemic planning and emergency preparedness, cancer prevention, heart health, AIDS, air quality, healthy growth planning in the municipality, healthy food and vending machine policies, equity and access, immigration and diversity, among others.

5. Structure

As mentioned above, the PHA has exemplary planning, evaluation, and epidemiology and library resource service functions. They have created nursing practice networks and have regular skill building seminars. There is very much evidence of a culture of learning and quality improvement within the PHA. And, the PHA is well positioned a key element of the provincial tobacco control resource system, participates in the TCAN, and networked with other PHAs and voluntary agencies in its PHU and region.

B. Organizational environment

1. Critical relationships

The PHA has relationships with the MHP and Ministry of Health and Long-term Care (MOHLTC), as well as the TCANs and Community Action Working Group (CAWG) and various subcommittees. There has been concern that there is generally not a lot of leadership coming from the MHP, although the creation of TCAN structures has certainly improved communication.

From time to time, the MHP or MOHLTC requests the participation of the PHA staff. For example, they were actively involved in the committees advising on future directions for mandatory programs and services by local public health under the HPPA.

It is noted that the bylaw-related activity during the 10 years leading up to it was enabled in part by the TCA, which actually modified the *Municipal Act* clarifying the mandate of municipalities to develop smoking control bylaws that supersede provincial statutes.

There is an expressed need to get straight answers from MHP lawyers and policy directors about the SFOA and this doesn't happen all the time (e.g. trucks and federal transportation regulations). There is a sense that more leadership and active engagement from the Ministry would be welcome but it is not forthcoming.

The manager of tobacco control is responsible for regular reporting to the MHP. Youth action alliances (YAA) and high school grants are seen as fairly prescriptive. However, this PHA has decided to link the two, which is not consistent with the MHP policy and funding guideline. In addition, the YAA advisor has been hired as a manager and this is also not consistent with the MHP view. The manager has therefore had to negotiate exemptions directly with the MHP on these matters.

It is also noted that several members of the coalition for a smoke-free region had key relationships with staff of the ministry of health and this provided important linkages and access to funding at a strategic time in the bylaw development.

The TCANs are seen to be a very positive development, providing a forum for information exchange and the coordination of regional planning and training programs. Relationships have been formed and continue to develop through the TCAN, leading to a substantial amount of telephone contact (networking) apart from meetings.

2. Financial transfers

Funding/financial transfers are made from the MHP to the PHA for 100% MHP funded SFO strategy activities. MOHLTC funds mandatory health programs and services pursuant to the HPPA on a 75% provincial, 25% municipal cost shared basis. In addition, in the past, the MOHLTC has provided 100% funding in the form of grants to the local smoke-free coalition to support implementation of the smoke-free bylaw (note: the coalition no longer exists). A grant for innovative smoking cessation services (internationally educated health professionals) was also received by the PHA.

3. Geography

The PHU is comprised of 4 rural townships plus three major urban core areas. The boundaries of the PHU coincide with the municipality. There are two levels of municipal government – regional and local.

The local health integration network that has been formed includes this municipality and at least two others. There are no cigarette manufacturers or tobacco growers in the area, although until recently a cigarette factory did exist in a neighboring PHU. There is a central corridor of municipal growth in this municipality. The area is also attracting a substantial number of new immigrants and becoming increasingly diverse.

It also has an established cultural heritage and a substantial and recognizable religious order that is influential in many community matters.

Smoking rates are higher in one of the three major urban areas, and this area also has a population with lower levels of formal education and lower income.

4. Partners and coalitions

The PHA has many partners in its PHU and its communities. Several are engaged or will soon be engaged in various aspects of tobacco control. Community partners include or have included hospitals, family doctors, the local health integration network, heart health coalition, council for a smoke-free region (no longer exists), university professors and various university departments (e.g. health, planning, psychology), voluntary health agencies (e.g. Canadian Cancer Society, The Lung Association, Heart and Stroke Foundation of Ontario), and others.

5. Politics

The medical officer of health is a commissioner in the regional government structure and one of his/her roles is the maneuvering of major policy and programs issues through the political process. He/she is also involved in all major communications as regional government is sensitive to political aspects of public health. In addition, he/she gives latitude to his/her staff to experiment and trouble shoots as need be. However, generally the council is supportive, as is evident in the substantial growth of the overall budget in the past several years as well as their willingness to see the bylaw come into effect in spite of substantial opposition from some quarters.

The community of the PHU is interesting. They seem to understand pragmatically the value of public health interventions. A very prominent cultural evident happens annually in the area – and the organizing board decided to make the event and its many venues smoke-free voluntarily. There are (or have been) many very knowledgeable and articulate advocates, including the coalition, who support tobacco control and their views could not be ignored in tobacco control bylaw discussions and decisions. At the time of the bylaw, a leading director of environmental health was always seen as highly credible, and calm in the face of controversy, which gave politicians confidence in moving forward.

The municipal politicians do not want controversy with the province and would rather call provincial politicians that engage in high profile rhetoric. This of course affects the direct advocacy action that the

medical officer is able to take, although on various issues of public health priority, including tobacco, he/she has chosen to sign on to provincial position statements (e.g. organized through the Association of Local Official Health Agencies).

At one time, the local member of provincial parliament was the minister of health. This may have influenced (or at least contributed in part to) the provincial decision to grant funds for public education to the municipality as it became the first smoke-free municipality. In addition, the successful local experience in the minister's riding may have influenced her to become a champion for tobacco control at the provincial level (which she was).

Within the PHA, there has been good central support for tobacco control from the medical officer and the planning and evaluation area. Lessons learned from tobacco control and other community engagement activities are now being summarized and will inform the PHA-wide approach to community engagement.

C. Information and Evidence

1. Empirical evidence

As mentioned above, the central area responsible for health determinants, planning and evaluation was created to enhance the capacity of the PHA in epidemiologic assessment, health status monitoring, performance monitoring, planning and evaluation. Health promotion positions have been transformed into health planner positions, responsible for planning and evaluation; and, every program in the department, including the tobacco control program, has a health planner assigned to it.

Evaluation is integrated into all new initiatives. Managers are acutely aware of the need for evaluation and are able to cite statistics related to their programs (e.g. environmental manager indicated that there was a ~98% compliance rate with retail provisions).

A central library service provides literature and actually proactively promotes awareness of new articles based on knowledge of professional interest within the department. By all reports, this is an excellent service.

Tobacco control is seen to be one of the stronger areas vis-à-vis evidence-informed practices. The manager of the tobacco control strategy has an evaluation background. He/she has actually led training on logic model development in previous jobs for another employer – and is a strong proponent of their use, including in her program.

Empirical evidence is also derived direct experience. For example, the manager responsible for enforcement of the smoke-free bylaw had many excellent stories and examples to relay about experiences in enforcing the law (including confrontations, public trying to urinate on enforcement officers, pictures of officers being placed on bar room walls with the caption "wanted dead") – as well as lessons learned, rationale for choices and outcomes achieved (e.g. compliance).

The PHA is now encouraging more publication of analyses conducted, as the analyses are seen to be relevant to community partners.

Sometimes, professionals in the department feel overloaded with information. Therefore, there is a reliance on many different professionals to attend to various information sources, as no one is able to command the large volume that comes through the department. On specific program developments, literature reviews are conducted in the course of planning (e.g. workplace strategies). There is also a reliance on third party interpretations of best practices (e.g. Registered Nurses Association of Ontario [RNAO] guidelines on best practices in smoking cessation).

Performance monitoring and health status monitoring are integrated into the operational planning cycle. The staffs are encouraged to take the Health Canada course on surveillance which is available on line. (In

non-tobacco area, the PHA has received funds from Health Canada to establish a food safety surveillance unit.)

The PHA would be interested to see provincial data reporting and standards for benchmarking and comparison as part of the mandatory programs and services currently being revised in 2007.

2. Technical assistance and training

Technical assistance and training is a major capacity of the PHA. The PHA is a partner in a key provincial resource centre funded under the SFO strategy and lessons from the implementation of the regional 100% smoke-free bylaw were used as part of the training for the implementation of the SFOA. Even the decision by the province to implement the SFOA on May 31, rather than January 1, suggests that Ontario learned from the regional experience.

The PHA clearly values training. Job descriptions have clauses that indicate that staffs are encouraged to take course. Courses related directly to the job are reimbursed at 100% and courses that are for career development are reimbursed at 50%, all in an effort to encourage professional development and to enhance the quality of services provided by the PHA. Training programs are also conducted in-house, sometimes with external consultants (e.g. from other PHAs) and sometimes organized by management. For example, there were trainings on the protocols for the enforcement of the regional smoke-free bylaw in preparation for its implementation. Enforcement policies and procedures were drafted with staff input, there was a large training session, and through professional interactions (e.g. questions and answers) it was decided that the procedures should be slightly adjusted before implementation.

The senior management supports the development of new initiatives, including the creation of the new tobacco unit. Support comes from the area responsible for health determinants, planning and evaluation.

The region is concerned with leadership development, management development and succession planning and training is offered corporately for senior staff.

A central communication unit is responsible to assist with branding, look, consistency and plain language and clear communication of messages.

Also, as a PHA partner in the resource system, staffs are aware of SFO strategy supported trainings and organize these in collaboration with the TCANs. Staff has taken advantage of the RNAO resource on best practices in smoking cessation. There are regular (weekly) trainings on planning skills, a nursing practice committee, and some staff report opportunities through Heart Health to participate in training (e.g. organized by the Heart Health Resource Centre or separately funded).

3. Networks

The PHA is connected through the media network, TCANS, and the network of health promotion resource centres in Ontario. Through the Program Training and Consultation Centre, in collaboration with the Ontario Tobacco Research Network, it is expected that networks and communities of practice will be established in the coming months during 2007/2008.

The work of the tobacco control program is dependent on having strong community networks. Described above, the now defunct coalition for a smoke-free region was instrumental over many years in advancing gains in tobacco control policy. Public health inspectors have a strong *esprit de corps* and all public health inspectors supported those principally responsible for the enforcement of the bylaw. Police also supported the implementation of the compliance strategy, and courts certainly upheld and supported the law.

4. Background

In addition, there is a substantial amount of information in the background that provides a basis for practice and decision-making. For example, there are internal audits and the department is aware of the need for them. In fact, it is participating in a regional government wide audit of an immunization program voluntarily in order to learn from the experience. Charts are pulled randomly to audit quality of inspection and the same is planned for cessation counseling services. The board of health approves all programs and the board is accountable to the MHP for the execution of the tobacco control aspects of mandatory programs and the SFO strategy. The enforcement aspect of the SFOA and bylaw at this point are largely coordinated by licensing and the manager receives information from this sister department for purposes of reporting to the Ontario government. In addition, as the PHA sees all of its programming being that which is funded 100% under SFO strategy, very few additional resources are available for execution and ensuring the expansion of the scope and reach of a comprehensive regionally based strategy – although this may change in the future depending on overall priorities.

D. Interpretation and Contextualizing

1. Adapting and contextualizing

As noted above, the PHA and its regional council were among the first to successfully implement a 100% smoke-free bylaw in Ontario. There was no Ontario precedent from which they could learn. However, they did learn from experience in British Columbia (BC) – the local bylaw experience in Victoria and the experience of the BC Workers' Compensation Board regulation that effectively eliminated smoking from many indoor workplaces across that province. Also as noted above, the director of environmental services was expert in the health effects of tobacco, understood the dilemmas with designated smoking rooms and the ineffectiveness of ventilation options.

The need to adapt programs to local circumstances – settings, populations, etc. – is well understood in the health department. The process of setting up logic models is used to socially construct a local program theory of action informed by the scientific literature, as well as information and knowledge about local implementation contexts is considered. In addition, work with community partners (e.g. smoke-free council on educational initiatives previously, but it no longer exists) is shaped by the views of all participants, including views about what is appropriate for the PHU.

Within the PHA, given the respect that is accorded to labor relations agreements, there was some difficulty in creating a role for internationally trained health professionals. The role described in the proposal that was funded was too close to that of public health nurses. Therefore, it was decided that the cessation innovation would be better implemented through a partnership agreement with a local YM-YWCA, which had considerable experience with immigrating clients.

2. Social construction of knowledge

There is recognition within the PHA that professional public health practice is about evidence-informing practice decisions and action. However, local experience sharing, working with partners, coming to common understandings about what will work or is working or not in practice, are all seen as part of larger learning processes. Evidence is seen to be necessary, but insufficient for sound decision-making.

The PHA trained internationally educated health professionals to do smoking cessation work in their first language with 10 or 12 different immigrant groups; they received permission from a university faculty member to use a youth leadership scale to study YAAs; are working to evaluate a hospital-based cessation program adapted from the Ottawa Heart Institute's model; have engaged Garfield Mahood to conduct a training to transfer understandings about the tobacco companies' roles in propagating the epidemic; continuous access the resource centre and are fed material that the resource centre staff think may be of interest and use to program staff; engage the central resource of epidemiologists and evaluators as necessary to design and evaluate interventions; and so on.

The regional council has come to trust and respect the PHA. They are known for having "done their homework", i.e. their advice is well grounded in evidence and reasons. Politicians are aware that the PHA is engaging community groups and know that the PHA is acting in the interest of public health and in so doing is serving council well.

Clearly, the staff of the health department learns from each other. They articulate their experiences in the form of externalizations/stories as discussed above (e.g. violent, urinating patrons, as well as threats to personal safety). They view their senior leadership as role models (e.g. calm under pressure) and respect professional contributions by those who have worked in the department, included the deceased and retired former staff. They take pride in their accomplishments and know that they have led the way on smoke-free policy. For many, professional identities are tied to their accomplishments and they are recognized and asked to participate in provincial and national processes as a result of their leadership. In addition, they document their experience in the form of monographs which outline PHA and external coalition strategies in separate monographs. And, they are learning from their own experience and others to develop a department-wide approach to community engagement.

The medical officer of health underlined the importance of relationships and trust. He or she described vision and knowing where you want to get to as the ends; the means are the relationships. These determine what is possible and how things are done and how influence is exercised, or not. Working with the community, community engagement – ensuring that the community will support effective public health action is all about trusting working relationships, and clear and shared understandings about roles and responsibilities, as well as work together to actually create change.

3. Theories of action

This PHA has fully embraced the notion of logic models to provide a basis for program and policy intervention design and evaluation. They understand when their models vary from that of other jurisdictions (e.g. as mentioned above the YAA and Ottawa Heart Institute model were modified to better fit local circumstances and may be seen to represent different models). The department's central resource department supports logic model development and operational planning, as well as monitoring and evaluation. Access and equity strategies and the approach to community engagement represent two standard approaches to coordinated theories of action framework development within the PHA.

4. Working knowledge and knowledge conversion

As mentioned above, information overload is definitely a challenge for senior staff. One senior person admitted giving up on trying to keep up with the literature, due in large part to volume. The source of information is seen to be very important. And, there is a reliance on professional staff throughout the PHA to attend to the literature on an ongoing basis (i.e. in their areas of responsibility, including tobacco control). The medical officer will attend to things that are of a political and communications nature, but there is a real reliance on the manager of the tobacco control unit to manage the program and attend to decision-making at his/her level.

People's own interests, professional backgrounds, frames of reference, and day-to-day information requirements certainly affect what professionals attend to and on what basis they interact with others. There was some concern expressed that people retain the corporate memory of the PHA and when they leave or move on, this memory "just walks out the door with them".

Also interestingly, there is a view perhaps among some tobacco control advocates, that you can not have a passion and commitment to the issue if you have not worked in the field for a long time (e.g. 20+ years). However, it is also recognized that new people, from other fields, bring new and fresh perspectives – even if they may sometimes be undervalued.

D. Decision-Making, Practice Integration, and Experience

Within the PHA, there are line responsibilities and accountabilities that have been delegated and there are many decisions that are made that are strategic, management oriented, and/or operational in nature. There are annual and seasonal budgeting and operational planning cycles.

The tobacco control unit manager has lead responsibility and the medical officer of health looks to the manager to oversee all developments and to look to other managers and himsel/herself for support as needed. At this time, there is much effort focused on the development of SFOA implementation, YAAs, high school grants, hospital-based cessation, workplace programming, and the administration of the PHAs aspect of the provincial resource system.

In the future, it is anticipated that the program will try to reengage the interagency council and possibly the coalition responsible the PHU's approach to indicated chronic disease prevention. However, in light of resource constraints and having been through a major effort to support resource centre related developments (including hire staff, supporting SFOA implementation province wide through training), it is unlikely that there will be a major effort in the short term to advance a comprehensive integrated tobacco control strategy for the PHU (e.g. including engagement of the chronic disease program resources).

There is also a sense that much has been done on the second hand smoke front and little or no attention at all is currently being given to bylaw reforms. The medical officer is nonetheless concerned that the tobacco companies may find a strategy to advance the use of their product among young people and there is a need to be vigilante.

E. Time

Of course time is an ever present aspect of all life and public health work is no different. However, various aspects may be differentiated. For example, tempo pertains to the pace of activity. When implementing new legislation, there is an imperative to be ready for the effective date. Annual events have their own temporal imperatives and urgencies, but are more easily planned when integrated with operational routines. There are decisions and action plans that require decisions in practice situations (i.e. on the spot); others that occur over longer time frames (e.g. national non-smoking week, campaigns for cessation, or day to day), and over a course of years. As mentioned above, this PHA was a leader among Ontario PHAs by advancing an early 100% smoke-free bylaw. There is a tendency to talk of the PHA's history by referring to various eras (e.g. early bylaws particularly pre-amalgamation, post TCA including bylaw developments and coalition activity and council debates up until the 2000 bylaw implementation, and post SFOA and strategy).

3. Tobacco Control Action System in a Rural Context

This rural county public health agency (PHA) is currently in the midst of a major organizational transformation in which staff participation and emergent leadership is being demonstrated. The general developments in public health system transformation are to some extent being reflected in the tobacco control program. However, tobacco control is clearly a treated as a separate initiative supported and organized with 100% funding from the Ministry of Health Promotion (MHP).

The public health unit (PHU) is a large geographic area, more than 3,300 square kilometers. However, its population base is less than 60,000 and the population density is less than 20 people per square kilometer. According to Statistics Canada, the PHU actually decreased slightly in size in 2006, i.e. less than 2% decline in total population between 2001 and 2006 censuses.

The prevalence of smoking (age 12+ years) is about the same as the provincial average. However, the prevalence of smoking in a vehicle when children are present is higher than the provincial average. There was an increase in smoking prevalence in the PHU from 2000/01 to 2005 of less than two percent, compared to about a 4.3% provincial decline in prevalence.

A. Organizational aspects

1. Capacities and competencies

There are about 5.7 full time equivalents (FTE) staff funded under the Smoke-Free Ontario (SFO) strategy and about 10 FTE positions have been funded under the mandatory chronic disease prevention program cost shared with the Province of Ontario pursuant to the *Health Protection and Promotion Act* (HPPA).

In this PHA, the chief executive officer function is shared between the medical officer of health and the executive director – the former exercising the duties of the medical officer as laid out in the HPPA and the latter taking responsibility for executive administration and management responsibilities including program-related developments. These two individuals work very closely together to provide overall direction for strategic planning and PHA transformation.

The organization is divided into a series of trans/inter-disciplinary divisions (5), each with their own scopes of responsibility under the direction of a senior manager. Tobacco control is part of the healthy environments area (known as "quad" for quadrant, even though there are five areas). The senior manager directing the area is a seasoned public health professional with considerable experience in tobacco control bylaw development, enforcement and public health inspection. He/she decided that she/he needed to hire a tobacco control manager to manage effectively and competently this expanded portfolio. Subsequent to the interview, a tobacco control supervisor was also hired. The supervisor and manager are supported by the director, mentored not micro managed. The supervisor and manager in turn are hands on and take full responsibility for developing the program with support from the manager and staff.

Previously, tobacco prevention was part of a healthy lifestyles area and when the PHA went through a restructuring exercise, tobacco use prevention was split out and combined with enforcement and promotional aspects which previously had been contracted out. There is one tobacco enforcement officer and he considerable prior experience with bylaw enforcement in this and neighboring PHUs. Previously, he/she had been contracted to enforce the county bylaw that ban indoor smoking and his company was engaged in the enforcement of similar laws in near by PHUs.

At the time of interviews, the coordinator/manager position was in fact vacant. The previous coordinator by all accounts was a well respected and competent public health profession and he/she had recently accepted a position as the TCAN coordinator in the region. All PHA staff was pleased for the professional development opportunity that this change afforded this person and were looking forward to working with him/her in his/her new role. The youth action alliance (YAA) was under the supervision of this person and will become the responsibilities of the new manager when he/she is hired.

This, like most PHAs, is a unionized environment. Often unionized staff does not want to work weekends, evenings, and the need for flexible work arrangements has been an issue in the past. Contracting out bylaw enforcement was a way around this particular issue.

There is a general sense that the health department may be understaffed, although there has been support from the board of health to add staff and enhance union staff position funding levels in an effort to attract and retain staff. However, directors and senior managers appear to be underpaid in comparison to other health units (perhaps 30% or more in some cases).

There is concern about senior staff leaving, but no apparent succession planning occurring at the moment (or at least this was not discussed). In part, as a result, managers often are hired with little management experience (e.g. 3-5 years) and these individuals burn out. Senior staff is seen as very supportive and nurturing – however, the work demands are seen to be too large to sustain over time. Staff turnover leads to corporate memories walking out the door, with junior people not knowing the history or having experience. Nevertheless, there is hope that organizational changes will be able to address these issues in the future.

The medical officer of health and the executive director are appreciated by their staff. They are seen to be supportive and trying to affect change. Numerous examples of positive developments which are resulting from their leadership are apparent (see organizational changes and developments below). The PHA is practicing empowerment of staff and trying to address the social determinants of health through the daily practice of all health professionals employed by the PHA. The strategy is essentially to take advantage of the many skills of staff throughout the PHA within an interdisciplinary, fully matrixed organization with management oversight of professional work assigned within defined areas of responsibility.

The PHA is developing its epidemiology function and participates in the Rapid Risk Factor Surveillance Survey. It is also investing efforts in new information technology, particularly web portal services (community information).

At the time of interviews, the PHA was in the midst of the accreditation process – having submitted material to the Ontario Council on Community Health Accreditation and in the midst of planning for the site visit. This effort is a PHA-wide effort requiring substantial commitment from senior management and it was being coordinated by the manager responsible for the continuous quality improvement area.

In the area of enforcement, it was explained that there are good working relationships with other local enforcement staff – including public health inspectors in the PHA, other public health agencies, Health Canada, and police. In fact, the enforcement network across the province is extensive, facilitating good communication and exchange of information/lessons as well as mutual support (e.g. police presence when needed, at least locally in this jurisdiction). There is apparent clear respect for the abilities of the prosecutor that works with the PHA. The local justice of the peace is apparently also very supportive of actions take by the enforcement staff, actually increasing fines in some instances.

Within the PHA, there is a philosophy of working with the community, even in trying to achieve compliance with legislation, i.e. trying first to achieve compliance through education prior to enforcement action and prosecution. There is also interest to ensure that tobacco control programs are complementary and not causing issues for the implementation of other programs that are based almost exclusively on the basis of positive appeals. For example, the PHA working relationship with schools is largely a positive, supportive health promotion-oriented approach and the tobacco enforcement officer consciously tries to dissociate him/herself from these so as not to confuse the enforcement and school health promotion programs (which are seen as complementary).

There is only one tobacco enforcement officer for the entire county. He/she coordinates efforts with public health inspectors so that they are aware of any fines or violations that may affect relationships with various business/settings (e.g. if there is a charge laid, the tobacco enforcement officer informs public health inspection colleagues and vice versa).

Given the broad social determinants of health orientation taken by this department, it is not surprising that they have spent time and energy to establish working relationships with other agencies – e.g. social services, planning to addressing built environments and drifting smoke in multiunit dwellings. They have also engaged the community by implementing a qualitative (table top based) study with people in low income and living in poverty in order to assess needs, establish dialogue, and work together to affect change – based on trust before change.

The PHA has also worked at maintaining good working relationships with the TCAN and the Public Health Research Education and Development (PHRED) project in the regional teaching health unit. The executive director actually came from another PHRED site and relationships with it and their staffs have also been maintained.

The PHA is also actively engaged in pandemic and other public health emergency planning (e.g. major snow storms) and has developed plans to address needs for surge capacity in emergency situations (including shifting job responsibilities).

There is recognition that the PHA is assuming a particular role in the context of a provincial strategy, with coordination mechanisms in place through the TCAN. There are some differences of view however about the degree of integration of the tobacco control program within the overall departmental program, and some senior management sees the tobacco enforcement aspect in particular more controlled by the Province than it would like (i.e. seen as being not entirely consistent with the PHAs working with business philosophy, although clearly the tobacco enforcement staff and his/her supervisors practice progressive enforcement strategies).

2. Organizational culture

The organization culture in general is seen to be collaborative and open. The senior management is consciously trying to practice their espoused values – making the organization a bit flatter and consensual, and giving control over to frontline staff in an effort to address equity considerations. The senior management also appreciates that latitude that they have to introduce business development concepts and to work with staff to shape the new public health in this rural county.

Values include a focus on social and broader determinants of health, equity, participatory decision-making, innovation, community, active staff engagement, and excellence (e.g. through accreditation and planning for it). The PHA prides itself in its innovation and wants a stronger working relationship with MHP, MOHLTC, and other PHAs to share and learn from them as well.

The management style is by all accounts very supportive, where senior management encourages staff to bring issues to the table. Staff has a voice and is expected to speak at staff meetings, as opposed to managers/directors making reports, and the same is practiced often at the board of health.

The PHA embraces an evidence-based approach, multidisciplinary perspectives, client centered approaches, reflective practice and staff engaging processes, as well as valuing youth and youth peer perspectives (and trusting them in their roles). The population of the county expands substantially during the summer months (at least three fold increases) and the PHA is committed to ensure the provision of services and therefore safe water and water quality monitoring are priorities. Recent priorities, PHA-wide (in 2006) were poverty, water, e-health, and primary health care.

There is also interest in showing value for money to tax payers, accountability through compliance monitoring, annual staff performance appraisals, and accreditation.

The PHA has also adopted a balanced score card approach for its operational management and performance evaluation. This includes health determinants and health status, community engagement, resources and services, and integration and responsiveness.

The organization also respects that there are different personalities, with different modes of thinking and interacting. Everyone in the PHA apparently knows their "personality colors" and people in the PHA value differences in perspectives and contributions which are presumed to be associated with these.

There is a sense that "everybody makes mistakes", that the PHA recognizes that mistakes sometimes happen, but there is an interest to ensure that staff learn from mistakes and learn to not repeat them.

3. Organizational changes and developments

As mentioned above, the PHA has recently undergone – and continues to undergo – transformation. This has been more than three years in development. The vision of the PHA is to "create healthy communities together" based on public health principles of equity, power sharing, and capacity building – based on systems thinking (e.g. self organization), building on existing expertise, assets, capacities etc. and affecting change through multi-small scale, locally-based and defined projects, capable of accessing and leveraging community resources. There has been an explicit attempt (apparently succeeding attempt) to foster a cultural shift that will see the PHA as a complex and adaptive system, responsive and engaging on the basis of community need.

The new structure is based in four interacting inter/trans-disciplinary (quads) divisions – supporting healthy communities, building community capacities, protecting the environment, and strengthening families – and more recently a quad responsible for continuous quality improvement (i.e. a fifth "quad" was added). Tobacco control is seen to be integrated within the broad social determinants of health framework but, as mentioned above, is organizationally nested within the quad responsible for healthy environments.

The process used to bring about these shifts has included: creating a transition group, engaging all staff in full staff days, respecting staff input and allowing the organization structure (and names, e.g. quadrants or quads) to emerge through consensus, and a commitment to an open organization and dialogue.

Senior management is respected for its management philosophy and for "walking the talk".

At least one bone of contention exists with respect to organizational changes, but it is not of the PHAs making. There is substantial concerned that provincial level granting is not sensitive to real world timelines. Time required to contact partners, co-design strategies in response to requests for proposals, and make submissions to meet tight deadlines; yet there are delays in funding decisions and announcements (or worse announcements that don't respect rural needs and structures, e.g. only one community health centre), and premature termination of funding. It is not possible to build sustainable, viable initiatives (including making staffing and organizational changes to sustain efforts) when funding programs have short turnaround and present difficult funding timelines.

4. Potentially competing public health issues

A wide variety of potentially competing issues – or integrating opportunities – were identified in the interviews. These reflect a "broad social determinants of health" perspective. These include: integrating determinants of health into practice, healthy babies/healthy children, environment, injury prevention, rural, recreational water quality and safety, economic health, beach water, chronic disease prevention, recreation, housing, obesity, transportation, substance abuse, motor vehicle accidents, care booster seats, food safety, liquor in corner stores, mental health, social determinants, addiction services, built environments, good food box, people living in poverty, enteric disease, infection control, wind turbines, pandemic planning, infection control practices, post partum depression, safe water and plumbing inspection/septic systems, beaches sampling, food safety, pandemic, emergency planning, show storm, tornados, pandemic, and SARS.

Tobacco control has been a priority in the past, with the implementation of a county-wide smoke-free law, which actually goes beyond the provincial SFOA to ban smoking in hotel and motel room. The PHA has also fully embraced the SFO strategy components within the healthy environment area. The above issues

are listed to illustrate that there are many public health issues, framed in various ways do not include tobacco control. The reality is that the PHA must deal with many issues beyond tobacco.

5. Structure

The interdisciplinary divisions have already described above. In addition, it is important to note that the county council also tobacco control related items on its agenda from time to time, including planning for built environment, which provide opportunities for tobacco control (e.g. elimination of second hand smoke from county built facilities).

It should also be noted that there is a culture that values staff learning, evidence-informed practice is imbedded in job descriptions and planning documents for accreditation, and all managers encourage their staff to engage in professional development opportunities. Like many functions, this professional development function is diffused throughout the organization but discussed centrally.

B. Organizational environment

1. Critical relationships

PHA senior management recognized that there is "a disconnect" between the MHP and MOHLTC and some concern about the difficulties of coordinating efforts that emanate out of the two ministries (e.g. mandatory programs and SFO strategy or other health promotion work). Furthermore, there is a clear and wide disconnection between the reality of public health field work in rural Ontario and the central offices of the government. There have been repeated attempts to engage MHP senior management, sharing information about programs, meetings etc. – but there is apparent disinterest as MHP does not respond. There is some speculation about lack of capacity in MHP and/or excessive demands of time.

Senior management recognizes that there are solid foundations for the SFO strategy. However, here too, there is an apparent feeling of disengagement and disenfranchisement of senior management who are not directly involved in the strategy. They must and do receive information through their staff, but not directly from MHP. For example, there is a sense of a "prosecution imperative" from the Province with respect to the SFOA and this is out of synchrony with the basic philosophy and approach normally taken in the PHU by the PHA.

Furthermore, there is no clear sense about how apparently related initiatives, such as substance abuse prevention and treatment and tobacco control, are being coordinated centrally by the MHP and MOHLTC – or whether there may not be efforts to do so. The PHA has developed substance abuse intervention (web based) for rural youth, and it is not being noticed by the province in spite of efforts to promote it to MHP. There is a sense that perhaps the MHP isn't there or doesn't care ("Why isn't there anyone at the MHP level that understands and supports the field and notices what is happening out here?").

There are some good working relationships between specific staff and provincial health promotion resources centres, including the resource centres for tobacco control (e.g. Program Training and Consultation Centre, Non-Smokers' Rights Association and Smoking and Health Action Foundation).

In the enforcement area, there is recognition that background and guidance provided at the provincial level requires local interpretation by enforcement staff and prosecutors. There is a sense however that the MHP staff directing the effort are not very experienced, particularly with respect to public places and workplace smoking bans and enforcement of them, although they may be trying. The enforcement staff respects the MHP responsibility and authority to provide directives related to compliance with the law. In one instance, a letter directed to a business was at variance with the enforcement plans of the local officers. Again, in this instance, there was not a problem with the letter or decision, but a concern that local tobacco control enforcement personnel should be apprised about such changes in a timely way and not be confronted by apparent violators of the SFOA that their interpretation is in error – or at least at variance with MHP communications.

Enforcement staff is actively engaged with the TCAN subcommittee on and they respect the integrity and interest of the TCAN coordinator to communicate and try to ensure consistency in the enforcement approach across the region. There is a sense that communication at the TCAN is excellent. Furthermore, there is confidence that issues raised at the TCAN are taken forward to the MHP or Community Action Working Group or subcommittees provincially, although there is little communication back about the outcome of deliberations on those issues. Most tobacco enforcement officers are out of the information loop about what happens at the provincial/MHP level.

The movement of the tobacco control supervisor from the PHA to the TCAN is seen as a good career development opportunity for the individual. Furthermore, it is anticipated that this will ensure good and continuing communication between the TCAN and PHA. The tobacco enforcement officer sees the value in the TCAN subcommittee and may play and active role in it in the future.

TCAN sponsored training events have been useful and are anticipated to be so in the future.

As mentioned above, there are some issues with the apparent top down directives on enforcement and prosecution coming through the TCAN and MHP.

2. Financial transfers

This PHA, as with others, receives funding under the HPPA on a 75 percent provincial cost shared basis, and SFO strategy funding on a 100 percent provincially funded basis. The funds specifically enable interventions under the SFO strategy – SFO enforcement, YAA, high school grants, and cessation training. It is not clear what proportion of HPPA funding is directed toward tobacco-related mandatory programs and services, e.g. under the chronic disease prevention or other programs.

Some funds have come from Health Canada and the US Environmental Protection Agency for non-tobacco specific research and program development (e.g. substance abuse, recreational water quality risk prediction models).

As mentioned above, there is concern about the erratic administration of grants by the province. An innovative grant for smoking cessation supporting people at high risk (people with mental illness, living in boarding homes, youth at a correctional facility) was given late and prematurely terminated before benefits could be demonstrated or the program institutionalized. This is seen as an unwise use of taxpayer dollars.

3. Geography

The PHU is one of the largest geographic areas among all PHUs. Sixty-four percent of the population relies on a septic system (i.e. rural). Public health inspectors spend about 35% of their time simply traveling between locations. A substantial amount of recreational water is obvious and tourism is a major contributor to the county economy, as is agriculture. There is a county council/government structure.

There are several small towns and hamlets (perhaps 12-15 depending on size definitions). As mentioned previously, during the summer months (May to October) the population swells three fold.

There is no public transportation.

4. Partners and coalitions

Local organizations include manufacturing industry, a mine, local businesses (including tobacco retail vendors, public places and workplaces that are now smoke-free), farms, hotels, motels, and churches. There is collaboration with the local addictions services agency (which is incorporated with the PHA in the same building, and under common administration), a single community health centre, family health teams, and a hospital. In addition, there is some collaboration with social services more generally, Health Canada,

Public Health Agency of Canada, PHRED, and a smoking control alliance with a neighboring PHU. A partnership with a health sciences centre library to provide training to public health nurses on the use of local library services is also being considered. At one time, the PHA was involved with the Not-to-Kids program related to compliance with tobacco retail provisions of the *Tobacco Control Act*.

5. Politics

Local, rural and small town politics is sensitive and personal. Local county council is very supportive of the determinants of health approach adopted by the PHA – and county council has been supportive of efforts to innovate.

When it comes to enforcement, there is no political interference. However, there is sensitivity on the part of the executive to give a heads up to the warden, reeve, and mayor in a particular area when a major charge leading due to repeated violations of the SFOA (e.g. a prohibition on tobacco sales). As one of the local or provincial politicians may go to a store or donut shop for his/her morning paper or coffee, this is a courtesy to be sensitive to the fact that he/she may hear about it on a next encounter. (There is a story about a local farmer charged with dropping a load on a highway, and when charged, he informed the charging police officer that his/her actions would affect future negotiations with the police services board over salaries.)

With respect to relationships with the province, the problems have been documented above. Good working relationships with police forces in the area are evident, as are with the justice of the peace and prosecutor and the PHA. Apparently, the first set of charges under the SFOA were very contentious leading to plenty of interesting interactions among those charged, the PHA, and local politicians, including an MPP.

C. Information and Evidence

1. Empirical evidence

There is a wide range of information and evidence that factors into local decisions in this local rural PHA – including empirical evidence, technical assistance and training, networks, and background information and considerations.

The PHA has chosen to use a balanced score card approach to planning and evaluating progress. The balanced score card developed initially by the Institute for Clinical and Evaluative Studies was used as an initial starting framework. All staff and divisions of the PHA were engaged in group meetings to decide which indicators would make most sense to them in their practice and the original measures were adapted or changed for local application. These in turn were used in the annual operational planning process.

Participatory reflective practices are reported to be integral to the meeting process within the PHA. Several evaluations have been conducted, including evaluations collaboratively conducted with universities. These included a substance abuse prevention project (with McMaster) and a community needs assessment (with Guelph).

The PHA intends to evaluate their experience with reorganization and changes in practice by engaging staff to "write their stories", with the division responsible for continuous quality improvement coordinating the exercise. The tobacco enforcement officer has many good examples to share about the experience with the enforcement of the SFOA. These included some troubling stories about enforcement in other jurisdictions (e.g. threats to young test shopper) and from his/her own personal experience (e.g. confronting tobacco company representatives in a convenience store, inspection in an under ground mining workplace etc.).

No evaluative studies have been conducted specific to tobacco control recently. However, there was a pre-post-comparison of smoking rates following the smoke-free bylaw implementation which did not find significant change.

Currently a health status report is being prepared from a determinant of health perspective and it is expected to have some tobacco control related content.

Not on a tobacco issue (actually pertaining to wind turbines), a systematic review was recently conducted in the PHA.

Surveillance on smoke-free and tobacco sales provisions is conducted by the tobacco enforcement officer who reports having a good idea about where the problem establishments exist and a good sense of the extent of compliance with the SFOA and Regulation.

2. Technical assistance and training

As mentioned above, systematic reviews are accessed through the library. Staff is giving time to take the Health Canada skills enhancement in surveillance course.

Senior executives indicate that sometimes the evidence from systematic reviews and the public health literature "drives you holistically" toward dealing with broad determinants of health as the area where you will have the "biggest bank for the buck". In planning for clinical services programs beyond tobacco control (e.g. depression), evidence was used extensively to guide planning. Reference was also made to "nursing best practices" in smoking cessation (Registered Nurses Association of Ontario) and the Canadian Community Health Nursing standards of practice.

Technical assistance is sometimes offered by colleagues at McMaster University and/or the Hamilton PHRED.

As noted above, in the area of tobacco enforcement, it is well recognized that provincially developed procedures and protocol can only serve as guidelines for local interpretation, contextualization, and implementation. The circumstances usually dictate what is workable locally.

As part of the move toward frontline staff addressing the social determinants of health, managers work with staff to assist them with interpretation and action – particularly as it relates to access and equity issues.

Enforcement staff uses education and training as a mechanism to increase compliance. Public health inspectors were also trained when the SFOA first came in. Tobacco enforcement staff assists public health inspectors with the laying of charges, as this is not a regular part of their routine work.

Professional education and development is highly valued in the PHA and the PHA is generous in supporting ongoing professional development and continuing education. The PHA has three staff enrolled in Master of Public Health part time programs. Participation in conferences and training is encouraged and professional development money is jointly managed – with feedback on conferences and trainings being expected.

3. Networks

As discussed extensively above, the organization itself is fully matrixed and multidisciplinary. Interdisciplinary section meetings are now embedded in regular practice. Informal networking is encouraged. It is a small staff and "team work makes it feels like a family". People are mutually supportive, and it actually takes time for new staff to adjust to this work culture.

The organization is conscientious trying to be more responsive and adapted to community needs. Peer networks and community collaboration is very much expected. The PHA staff are active participants in the TCAN and in many provincially organized developments (e.g. PHRED renewal, Family Health Team Quality Management Collaborative), and professional networks (e.g. Canadian Institute of Public Health Inspectors).

Enforcement staffs are well networked and have good working relationships with local police, as well as with other tobacco enforcement officers in other jurisdictions.

4. Background

The accreditation process, at the time of interviews, was consuming a great deal of senior staffs' energy. However, it was also seen as a constructive and positive experience.

Funding (at 100% provincial cost share for the SFO strategy initiatives and at 75% for provincial cost share of mandatory programs and services) also has obligations for reporting attached to it. SFO strategy also requires the submission of plans and a contract which also specifies deliverables.

Contracting out of enforcement services occurred in the past for purposes of the local smoke-free bylaw enforcement.

Human resources performance evaluation on an annual basis apparently also occurs in this PHA and during that time. Senior managers/directors' accountability is based, in part, on the status of the policy and procedures for which they are responsible.

D. Interpretation and Contextualizing

1. Adapting and contextualizing

As discussed above, the medical officer of health and executive director have adapted the role of chief technical and chief executive officer roles under the HPPA to work for their local circumstances in the PHU. This job sharing is an innovative solution enabling both individuals, who clearly respect each others' expertise and roles (and obviously like each other), to implement a working adaptation of more traditional medical officer and nursing director roles.

The medical officer and executive director are clearly seen to be leading a reorganization of the PHAs structure and engendering a new way of operating, as well as the frame of reference that will be applied to public health problems (i.e. determinants of health perspective). The approach, as discussed, is participatory, innovative, engaging, and community-based. All of these adjectives represent local organizational values and a lens through which all information and evidence is filtered on the way to decision-making and implementation.

As working *with* "people" living in poverty, mental health problems, living in board houses etc. a very human face is given to the clients of public health. This does not preclude an emphasis on broader policy changes (e.g. their county-wide smoke-free bylaw), but it does remind staff on a day in and day out basis that their jobs are to address the challenges of poverty and suffering which may be a circumstance of the populations they wish to serve.

This is a rural environment and that reality is never forgotten. And while the county is large geographically, it is "small town "– and personal; making sure that humanity is factored into all public health practice decisions. Furthermore, businesses and people who work in them (including the health department staff) have personalities and people are recognized as having unique qualities (some favorable others not). Local hospitals, manufacturers, community health centres, boarding homes etc. are all real places where real people work; and needs and reactions of clients in these setting are weighed as actions are taken. Similarly, people come with their own backgrounds (e.g. previous work in a large health unit, owner of an enforcement and security company, working at a PHRED etc.) and these perspectives are seen as assets. In short, people matter. This is true as public health decisions are considered and approaches are adapted for local use.

Nevertheless, the environment is still in a modern society. The PHA has access to blackberry, cellular phone, voicemail, internet (including email), and other technology. This affects daily life and undoubtedly affects adaptation of programs.

2. Social construction of knowledge

In many ways, the whole organizational change process is predicated on a social understanding of knowledge and a belief that professional public health practitioners, given latitude and with proper direction will develop shared understandings of the causes and remedies for social and environmental problems that are the root of disease and health causation.

This social creativity is reflected in the approach and the language: e.g. "you can talk about determinants of health and advocate for policy but it is on the ground that you are going to really make a difference", determinants of health and reorganization as a "framework for staff to create", "looking at information together", "transition working group"; "participatory approach to planning and evaluation", "whole restructuring was a reflective process", "trust before change", "groups of parents come together … up to 15 years" , "make sense", etc.

The PHA is deeply committed to social construction of knowledge through staff and community engagement. This is reflected in shared experience, articulation and social reflection on experience, combination and synthesis of scientific evidence and local knowledge, and commitments to action and accountability for it.

3. Theories of action

As discussed above, the reorganization is based on an ecological and organic model of systems thinking, participation, and joint reflection on actions. Logic models, frameworks for determinants of health, balanced score cards modified to fit locally, and evidence-based models (including the non tobacco example of predictive modeling of water quality, and tobacco models such as youth action alliances).

There is a real passion for new models of organizational innovation, cultural change, and public health practice.

4. Working knowledge and knowledge conversion

Clearly, senior staff of this PHA has a broad frame of reference. What sticks with senior management are ideas and frameworks to enable creativity, ideas that reinforce core practice (including scientific evidence), and innovative/creative solutions. Micro-operational material is less of interest, although recognized as important as well.

The PHA has also made a commitment to understand personality differences (colors). It is suggested also that perhaps senior management and staffs should value others who have complementary skills and knowledge sets to their own. From this comes learning and creativity.

D. Decision-Making, Practice Integration, and Experience

Within the PHA, while there are trans-disciplinary divisions, there are nonetheless line responsibilities and accountabilities that have been delegated. Furthermore, there are many decisions that are made that are strategic, management oriented, and/or operational in nature. There are annual and seasonal budgeting and operational planning cycles.

The tobacco control unit supervisor has lead responsibility and director/manager of environmental health looks to the supervisor to oversee all developments and to looks to other managers needed. At this time, the effort is extensively focused on implementation – YAAs, high school grants, and SFOA enforcement.

E. Time

Of course time is an ever present aspect of all life and public health work is no different. However, various aspects may be differentiated. For example, tempo pertains to the pace of activity. When implementing new legislation, there is an imperative to be ready for the effective date. Annual events have their own temporal imperatives and urgencies, but are more easily planned when integrated with operational routines. There are decisions and action plans that require decisions in practice situations (i.e. on the spot); others that occur over longer time frames (e.g. national non-smoking week, campaigns for cessation, or day to day), and over a course of years. As mentioned above, this PHA implemented a 100% smoke-free bylaw which is more extensive than the SFOA in so far as it also bans smoking in hotels and motels (including bed and breakfasts). There is a tendency to talk of the PHA's history by referring to various eras – i.e. post TCA, post bylaw and post SFOA and strategy.